



# ACUMEN

## **Wellness Prospective Evaluation Report on Six-Month Follow-Up Survey Outcomes and Estimated Operational Costs**

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## EXECUTIVE SUMMARY

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In the Affordable Care Act (ACA), Section 4202, subsection (b), Congress mandated that the Centers for Medicare & Medicaid Services (CMS) conduct an evidence review and independent evaluation of community-based wellness and chronic disease prevention programs (henceforth wellness programs) focusing on the following four priority areas:

- (i) physical activity, nutrition, and obesity (PANO);
- (ii) falls prevention (FP);
- (iii) chronic disease management (CDM); and
- (iv) mental health.

CMS, through its contractor Acumen, LLC and its partner Westat, Inc., is conducting a prospective evaluation of evidence-based wellness programs falling into the first three of the above ACA priority areas.<sup>1</sup> To assess the impacts of participating in wellness programs, the Acumen team identified six national evidence-based programs:

- PANO:
  - EnhanceFitness
  - Fit & Strong!
- FP:
  - Stepping On
  - A Matter of Balance (MOB)
- CDM:
  - Chronic Disease Self-Management Program (CDSMP)
  - Diabetes Self-Management Program (DSMP)

This report describes the status of the prospective evaluation of these wellness programs. First, estimates of the proportion of the general population of Medicare beneficiaries who are ready to participate in an evidence-based wellness program are provided. Next, the effect of beneficiary participation in wellness programs on subsequent self-reported health outcomes and behaviors is examined. Finally, operational costs of program delivery are estimated.

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<sup>1</sup> The Acumen team identified no evidence-based program primarily focused on mental health that met other study criteria, although some programs treated mental health as a secondary focus.

## ***Readiness to Participate in Wellness Programs***

Twenty-four percent of Medicare respondents met the definition of “ready” to participate in a wellness program, based on a composite readiness index developed from a nationally-representative survey.<sup>2</sup> Beneficiaries were more likely to be ready if they:

- Were younger (66-74 years), female, or non-white;
- Were aware of wellness programs in the community or online;
- Participated in a wellness program in the past two years;
- Had high self-efficacy or patient activation;
- Received a physician recommendation to participate;
- Reported having a higher body mass index (BMI); a chronic condition, such as arthritis, diabetes, or pre-diabetes; or more physical or mental limitations.

Those without a high school degree and those with transportation difficulty had lower levels of readiness. Interestingly, social support was slightly lower among those who were ready. This may signal additional social needs among those who were ready for behavior change and program participation, or it may suggest that those with more social support had their wellness needs met outside the context of a wellness program.

## ***Effect of Wellness Programs on Self-Reported Behaviors and Health Outcomes***

Wellness programs are improving several self-reported health outcomes and behaviors for participants relative to a comparison group of Medicare beneficiaries who have not participated in a wellness program. The magnitude of effects is generally small, but consistently positive and statistically significant for many measures.

Key findings include:

- PANO programs improved participants’ self-reported physical activity levels.
- FP programs improved respondents’ ability to perform typical physical activities for work or pleasure, as well as their confidence in balance.
- Participants in CDM and PANO programs were better able to maintain their physical health over time compared to comparison group beneficiaries, who reported declines in physical health from baseline to six months.
- None of the programs, including those focused on falls prevention, were associated with a reduction in falls in the past six months.
- None of the programs, including CDM programs that addressed medication use, influenced self-reported medication adherence between baseline and six months.

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<sup>2</sup> The composite measure was comprised of five survey items based on Prochaska’s stages of behavior change and one item on self-reported likelihood of enrollment in a wellness program in the next 6 months.

All three program types were associated with small positive effects in different areas of mental health. This is an unexpected finding given that the intended impacts of these programs are primarily medical and physical in nature. An important secondary benefit of participation appears to be enhanced mental well-being, which may result from both lifestyle changes and knowledge gained from programs, or from the social aspects of program participation.

### ***Estimated Operational Costs to Deliver Wellness Programs***

Across wellness programs, operational costs ranged from \$100 to \$500 per participant, excluding an outlier organization that reported start-up costs. However, operational costs presented in this analysis may be lower than the amount needed to sustain or scale up wellness program delivery. For example, CDSMP, DSMP, MOB, and Stepping On rely on volunteers to serve as leaders of the wellness program workshops. Some organizations reported routine turnover among volunteers, which can lead to challenges with sustainability and program fidelity. Moreover, reported estimates exclude facility costs for class locations because either: (i) organizations owned the facilities and could not reliably estimate the costs for a single room, or (ii) class locations (e.g., church basements, local libraries) were free or donated. This analysis included large organizations with mature wellness program operations, and thus the generalizability of these findings is limited.

### ***Next Steps***

Future reports will assess whether the positive impacts persist twelve months after program participation for the PANO and FP programs on physical activity, PANO and CDM programs on physical health, and all programs on mental health found in the survey-based evaluation. Future reports will also utilize Medicare claims data to assess program impacts on additional health, service utilization, and cost outcomes six and twelve months after program participation, and will consider these effects in relation to the survey-based analysis and operational costs of wellness programs.

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# 1 INTRODUCTION

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Community-based wellness and chronic disease prevention programs (“wellness programs”) aim to promote healthier lifestyles, lower beneficiary health risks, and ultimately improve health outcomes. Wellness programs have the potential both to improve the health of Medicare beneficiaries and to reduce spending in the Medicare program.

In the Affordable Care Act (ACA), Section 4202, subsection (b), Congress mandated that the Centers for Medicare & Medicaid Services (CMS) conduct an evidence review and independent evaluation of wellness programs focusing on the following four priority areas:

- (i) physical activity, nutrition, and obesity (PANO);
- (ii) falls prevention (FP);
- (iii) chronic disease management (CDM); and
- (iv) mental health.

In response to the ACA mandate, CMS adopted a three-phase approach to evaluate the impact of wellness programs on Medicare beneficiary health, utilization, and costs to determine whether broader Medicare beneficiary participation in wellness programs could lower future growth in Medicare spending.

The first two phases consisted of an environmental scan and literature review conducted by Altarum Institute and a retrospective evaluation conducted by Acumen.<sup>3,4</sup> CMS contracted with Acumen, LLC, and its partner, Westat, Inc., (“the Acumen team”) to conduct the third phase of this evaluation, a prospective evaluation of evidence-based wellness programs. The current Phase III prospective evaluation aims to round out CMS’s understanding of the potential impact of such programs on Medicare beneficiaries and the potential cost-saving opportunities for the Medicare program. Specifically, this evaluation effort aims to answer two primary research questions:

- *Research Question 1:* What proportion of the general population of Medicare beneficiaries is ready to participate in an evidence-based wellness program?
- *Research Question 2:* What is the impact of beneficiary participation in these programs on subsequent health behaviors, self-reported health outcomes, health service utilization rates, and costs?

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<sup>3</sup> *Environmental Scan of Community-Based Prevention and Wellness Programs in the United States Evidence Review Report.* Centers for Medicare and Medicaid Services (CMS): Altarum Institute. December 15, 2011

<sup>4</sup> Perlroth, D., Rusev, E., Marrufo, G., Packarg, M., Ghimire, E., Lewis, C., Montesinos, A., Dixit, A., Solomon, N., Masaki, M., Li, B. *Retrospective Study of Community-Based Wellness and Prevention Programs: Final Report to Center for Medicare and Medicaid Services (CMS):* Acumen LLC; 2013.

The results of these analyses will be used to inform and support additional CMS wellness and prevention activities.<sup>5</sup>

As part of the prospective evaluation to assess the impact of participating in wellness programs, the Acumen team identified six national evidence-based programs with a primary focus on physical activity, nutrition, and obesity (PANO); falls prevention (FP); and chronic disease self-management (CDM) for inclusion in the prospective evaluation:

- (i) Chronic Disease Self-Management Program (CDSMP)
- (ii) Diabetes Self-Management Program (DSMP)
- (iii) EnhanceFitness
- (iv) Fit & Strong!
- (v) A Matter of Balance
- (vi) Stepping On

Detailed descriptions of the systematic process to identify wellness programs for inclusion in the prospective evaluation and the approach to recruiting a convenience sample of coordinating organizations<sup>6</sup> are available in the “Wellness Prospective Evaluation Report on Baseline Survey Efforts and Qualitative Study of Program Operations and Costs.”<sup>7</sup> The Acumen team did not identify any evidence-based programs primarily focused on mental health that met the inclusion criteria, although some programs treated mental health as a secondary focus. Table 1.1 provides an overview of these six wellness programs and Appendix A provides additional details.

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<sup>5</sup> On November 4, 2016, CMS released the final rule in the 2017 Physician Fee Schedule (PFS) in which the Medicare Diabetes Prevention Program (MDPP) will be available to Medicare beneficiaries who meet specific enrollment and clinical criteria (<https://www.cms.gov/newsroom/mediareleasedatabase/fact-sheets/2016-fact-sheets-items/2016-11-02-2.html>). Policies to implement MDPP services were established in the 2018 PFS final rule on November 2, 2017. Effective April 2018, payment for MDPP services will be provided to approved MDPP suppliers who have full recognition by the CDC Diabetes Prevention Recognition Program (DPRP) and meet other criteria (e.g., interim preliminary recognition) as required by MDPP supplier enrollment rules (<https://innovation.cms.gov/Files/fact-sheet/mdpp-cy2018fr-fs.pdf>).

<sup>6</sup> Local organizations are referred to as “coordinating organizations,” reflecting that they either deliver or support delivery of wellness programs in the community.

<sup>7</sup> Wellness Prospective Evaluation Report on Baseline Survey Efforts and Qualitative Study of Program Operations and Costs. Centers for Medicare and Medicaid Services (CMS): Acumen, LLC. March 2016. Available at: <https://innovation.cms.gov/Files/reports/communitywellnessprgms-frstevalrpt.pdf>

**Table 1.1: Overview of Wellness Programs Included in the Prospective Evaluation**

ACA Priority Area	Wellness Program	Description	Duration and Intensity	Program Leaders	Content	Potential Impact
Chronic Disease Management	CDSMP	Group class for individuals with one or more chronic conditions, and their caregivers or significant others	6 weeks; one 2.5-hour class per week	Two trained leaders, one or both of whom are non-health professionals or peers with chronic diseases	<p>Techniques to manage:</p> <ul style="list-style-type: none"> <li>• Frustration and pain</li> <li>• Chronic disease risk and symptoms</li> </ul> <p>Knowledge to improve:</p> <ul style="list-style-type: none"> <li>• Diet and exercise</li> <li>• Medication use</li> <li>• Communication with health care providers</li> </ul>	<p>Improvement in:</p> <ul style="list-style-type: none"> <li>• Self-efficacy</li> <li>• Medication adherence</li> <li>• Chronic disease risk and symptom management</li> </ul> <p>Reduction in:</p> <ul style="list-style-type: none"> <li>• Progression of chronic disease</li> </ul>
Chronic Disease Management	DSMP	Group class for individuals with diabetes, and their caregivers or significant others	6 weeks; one 2.5-hour class per week	Two trained leaders, including one with diabetes	Similar to CDSMP but specific to diabetes	Similar to CDSMP but specific to diabetes
Physical Activity, Nutrition, and Obesity	Enhance Fitness	Group exercise class for older adults	Ongoing classes; three 1-hour classes per week	Certified fitness instructor	<p>Physical activity training for:</p> <ul style="list-style-type: none"> <li>• Stretching</li> <li>• Cardiovascular endurance</li> <li>• Strength training</li> <li>• Balance and flexibility</li> </ul>	<p>Improvements in:</p> <ul style="list-style-type: none"> <li>• Self-efficacy</li> <li>• Strength, balance, and mobility</li> </ul> <p>Reduction in:</p> <ul style="list-style-type: none"> <li>• Pain</li> <li>• Falls, and related fractures</li> <li>• Progression of chronic disease</li> </ul>
Physical Activity, Nutrition, and Obesity	Fit & Strong!	Group exercise class targeted at sedentary and de-conditioned adults with lower extremity mobility challenges, with or without arthritis	8 weeks; three 1.5-hour classes per week	Certified fitness instructor	<p>Health education, Goal-setting, Problem solving, Exercises:</p> <ul style="list-style-type: none"> <li>• Stretching and balance</li> <li>• Low-impact aerobics</li> <li>• Strength training</li> </ul>	<p>Improvements in:</p> <ul style="list-style-type: none"> <li>• Physical activity</li> <li>• Lower-extremity strength, mobility</li> </ul> <p>Reduction in:</p> <ul style="list-style-type: none"> <li>• Lower-extremity pain and stiffness</li> <li>• Falls</li> <li>• Depression and anxiety</li> </ul>
Falls Prevention	A Matter of Balance	Group class for older adults to reduce the fear of falling and to prevent falls	8 weeks; one 2-hour class per week	Trained lay leaders	<p>Coping strategies to:</p> <ul style="list-style-type: none"> <li>• Reduce fear of falling</li> <li>• Set realistic goals for increasing activity</li> <li>• Change the environment to reduce falls risk factors</li> </ul>	<p>Improvements in:</p> <ul style="list-style-type: none"> <li>• Strength, mobility, and balance</li> <li>• Social activity</li> </ul> <p>Reductions in:</p> <ul style="list-style-type: none"> <li>• Fear of falling</li> <li>• Incidence of falls and fall-related fractures</li> </ul>
Falls Prevention	Stepping On	Group class for older adults to understand their risk of falls, coping behaviors, and safety strategies in everyday life	7 weeks; one 2-hour class per week; plus one booster session 3 months post-program	Two trained leaders, one of whom is a current or retired health care professional or fitness expert	<p>Knowledge to assess:</p> <ul style="list-style-type: none"> <li>• Falls history and future risk</li> <li>• Home hazards</li> <li>• Safe footwear and clothing</li> <li>• Vision as it relates to falls</li> <li>• Community mobility</li> <li>• Medication risks</li> </ul> <p>Strength and balance exercises</p>	<p>Improvements in:</p> <ul style="list-style-type: none"> <li>• Strength, mobility, and balance</li> <li>• Knowledge of falls risk factors and safety strategies</li> </ul> <p>Reductions in incidence of falls</p>

These wellness programs are delivered locally by coordinating organizations under implementation licenses issued by the national wellness program. Appendix B provides information on these coordinating organizations. As shown in Table 1.2, a large proportion of the coordinating organizations that partnered with the Acumen team for this evaluation were located in the South (39 percent). One third were located in the Midwest (33 percent), and 21 percent were located in the West. The population density of communities served by coordinating organizations was roughly even across rural, suburban, and urban areas. Nearly half of coordinating organizations (43 percent) were non-profit or private organizations, and many were government-affiliated organizations (33 percent). Thirty-two percent of coordinating organizations also serve as the Area Agency on Aging (AAA) for their community. Two coordinating organizations, Senior Services of Seattle and Wisconsin Institute for Health Aging (WIHA), also serve as national leaders of wellness programs included in the study.

**Table 1.2: Characteristics of Coordinating Organizations that Submitted Baseline Participant Surveys**

Characteristics of Coordinating Organizations	Number and Percentage of Coordinating Organizations			
	All ACA Priority Areas	Chronic Disease Management <sup>a</sup>	Physical Activity, Nutrition, and Obesity <sup>a</sup>	Falls Prevention <sup>a</sup>
<b>Organizations Providing Data for the Current Report</b>	75 (100%)	35 (100%)	39 (100%)	25 (100%)
<b>Geographic Region</b>				
South	29 (39%)	19 (54%)	11 (28%)	9 (36%)
Midwest	25 (33%)	8 (23%)	17 (44%)	6 (24%)
West	16 (21%)	8 (23%)	9 (23%)	7 (28%)
Northeast	5 (7%)	0	2 (5%)	3 (12%)
<b>Population Density of Community Served</b>				
Mostly Urban	26 (35%)	12 (34%)	15 (38%)	6 (24%)
Mostly Suburban	20 (27%)	9 (26%)	10 (26%)	7 (28%)
Mostly Rural	18 (24%)	8 (23%)	9 (23%)	7 (28%)
Mixed Population Density	11 (15%)	6 (17%)	5 (13%)	5 (20%)
<b>Organization Type</b>				
Private Foundation or Non-Profit Organization	32 (43%)	9 (26%)	24 (62%)	9 (36%)
Government-Affiliated Agency <sup>b</sup>	25 (33%)	17 (49%)	5 (13%)	13 (52%)
Hospital, Health System, or University	9 (12%)	6 (17%)	3 (8%)	2 (8%)
Senior Center or Wellness Center	7 (9%)	1 (3%)	6 (15%)	0
Private For-Profit Organization	2 (3%)	2 (6%)	1 (3%)	1 (4%)
<b>Local Area Agency on Aging (AAA)</b>	24 (32%)	17 (49%)	6 (15%)	12 (48%)

<sup>a</sup> Some coordinating organizations offer multiple wellness programs and submitted study data for multiple ACA priority areas, and consequently these organizations are included under all applicable ACA priority areas.

<sup>b</sup> Including departments on health, public health, and/or aging, and government-sponsored councils on aging.

The Acumen team collaborated with the national leaders of these evidence-based wellness programs in order to recruit seventy-five organizations offering the programs. The Acumen team then partnered with these coordinating organizations to enroll Medicare beneficiaries as new program participants.

This report presents findings from baseline and six-month follow-up national beneficiary and participant surveys, and a review of program operational costs to deliver wellness programs for a limited number of organizations. Section 2 describes the survey samples and methods used for analysis. Section 3 outlines findings on the Medicare population’s readiness to enroll in evidence-based wellness programs. Section 4 summarizes the impact of wellness programs on self-reported health outcomes through six-month survey follow-up. Section 5 summarizes the operational costs of wellness program delivery, and the challenges and limitations associated with accurately estimating the costs of program implementation at the community organization level. Finally, Section 6 describes next steps.

## 2 OVERVIEW OF RESEARCH QUESTIONS AND STUDY DESIGN

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This section describes the data collected and the analysis performed to estimate the proportion of Medicare beneficiaries who are ready for engagement with wellness programs and the impact of program participation on self-reported health behaviors and outcomes. As shown in Table 2.1, surveys were conducted among wellness program participants and a national sample of Medicare beneficiaries at baseline and six months. Section 2.1 describes the national and participant baseline surveys along with the process used to create matched samples for the impact analysis. Section 2.2 describes the six-month follow-up survey, including the impact on samples sizes among the matched participant and comparison group samples. Sections 2.3 through 2.5 describe analytic methods for this report.

**Table 2.1: Medicare Beneficiary-Level Primary Data Collection Design**

Survey	National Survey	Participant Survey
Baseline	12 waves at 1-month intervals, by mail	Administered onsite at enrollment to new program participants over the 15-month enrollment period  Wellness program attendance records were also collected for those participants for whom baseline surveys were received
Six-Month Follow-Up	12 waves at corresponding 1-month intervals to all completing baseline survey, by mail	Administered by mail to all program participants at the corresponding six-month point

### 2.1 National and Participant Baseline Surveys

To estimate the proportion of the general Medicare population ready to participate in wellness programs (Research Question 1) and provide a pool of potential comparators for the impact analysis (Research Question 2), the Acumen team designed and conducted a survey of a nationally representative sample of Medicare beneficiaries. The team conducted a parallel survey of wellness program participants for the impact analysis.

#### 2.1.1 Survey Content

The baseline surveys were designed to measure readiness for wellness program participation within the national sample, and key outcomes and covariates for both national and participant samples. Variables collected include:

- **Demographic and socioeconomic characteristics**
- **Readiness for behavior change:** National respondents completed items on their readiness to improve diet, manage weight, exercise for health, exercise for balance, and manage chronic health conditions.

- **Likelihood of program enrollment:** National respondents gauged their likelihood of enrolling in a wellness program in the next six months.
- **Overall physical and mental health:** The Short Form Health Survey 36v2 (SF-36<sup>8</sup>) was used to measure overall physical and mental health as a function of key subdomains related to roles and functioning. The subdomains include:
  - *Physical functioning* - a 10-item scale that assesses performance of physical activities such as self-care, walking, moderate physical activities, and vigorous physical activities.
  - *Bodily pain* – a 2-item scale that assesses intensity, duration, and frequency of bodily pain and limitations in usual activities due to pain.
  - *Role physical* - a 4-item scale that assesses the degree to which a person performs their typical role activities (e.g., work or other activities).
  - *General health* - a 5-item scale that assesses beliefs and evaluations of a person’s overall health.
  - *Vitality* - a 4-item scale that assesses a person's feelings of energy and the absence of fatigue.
  - *Social functioning* - a 2-item scale that assesses the degree to which a person’s health problems interfered with normal social activities.
  - *Role emotional* - a 3-item scale that assesses role limitations related to mental health.
  - *Mental health* - a 5-item scale that assesses a person’s emotional, cognitive and intellectual status, such as the degree to which a person feels nervous, depressed, calm, peaceful, and happy.
- **Physical activity:** The Rapid Assessment of Physical Activity (RAPA<sup>9</sup>) aerobics and strength/flexibility scales measure the amount and intensity of the respondent’s usual physical activities (RAPA 1); and the level of activities undertaken to increase muscle strength and flexibility (RAPA 2).
- **Falls and balance:** Respondents were asked to provide the number of times they had fallen in the past six months. They also completed a series of six items measuring beneficiary confidence in balance, known as the Activities-specific Balance Confidence (ABC-6) scale.<sup>10</sup> These items ask respondents to rate their confidence in remaining steady for specific activities such as standing on their tiptoes and reaching for something above their heads or stepping onto and off of an escalator.

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<sup>8</sup> See <https://campaign.optum.com/content/optum/en/optum-outcomes/what-we-do/health-surveys/sf-36v2-health-survey.html> and QualityMetric Health Outcomes™ Scoring Software 4.5 User’s Guide (2004, 2007, 2009, 2010, 2011) for more technical details.

<sup>9</sup> Topolski TD, LoGerfo J, Patrick DL, Williams B, Walwick J, Patrick MB. (2006). The Rapid Assessment of Physical Activity (RAPA) among older adults. *Prev Chronic Dis* 3(4):8.

<sup>10</sup> Peretz C, Herman T, Hausdorff J, Giladi, N. (2006). Assessing Fear of Falling: Can a Short Version of the Activities-Specific Balance Confidence Scale Be Useful? *Movement Disorders* 21: 2101–2105; also see: <http://www.ncbi.nlm.nih.gov/pubmed/19615762>.

- **Medication adherence:** We used the Morisky-4 medication adherence scale<sup>11</sup>, which measures problems remembering to take medications and stopping medications when feeling better or worse. Percentages are based only on respondents who take medications.

Appendix C contains the baseline and six-month survey instruments for participants and the national sample.

### 2.1.2 National Survey Fielding and Sample Characteristics

The Acumen team drew the national sample from Medicare enrollment files. The study used three phases of sampling to arrive at a nationally representative, stratified sample of 19,512 Medicare beneficiaries selected to receive the national survey sample, oversampling women with diabetes to improve our ability to construct a matched comparison group for the participant sample. The survey achieved a response rate of 51.3 percent (n=9,203).<sup>12</sup> More details about the sampling, sample disposition, and weighting are available in Appendix D.

The national baseline survey results were weighted to reflect the stratified sampling design and to adjust for survey non-response, then linked with information from Medicare claims and enrollment data. More details about the weighting approach are available in Appendix D. Table 2.2 presents weighted demographic, Medicare enrollment, and utilization/cost characteristics of the baseline national survey respondents. Most respondents were white (Hispanic or non-Hispanic), lived in urban areas, and had completed high school. About 9 percent were dually enrolled in Medicare and Medicaid. The most prevalent diagnosis in the past year, among fee-for-service beneficiaries, was diabetes. The majority of fee-for-service beneficiaries did not have a hospital stay or emergency room visit in the past year.

**Table 2.2: Weighted Characteristics of the Baseline National Survey Respondents**

Demographics		Medicare Enrollment and Claims	
<b>Age<sup>+</sup></b>		<b>Enrollment status<sup>+</sup></b>	
Average years of age	75.6	% Medicare FFS (Parts A/B)	62.7
<b>Sex<sup>+</sup></b>		% Medicare Advantage/Other	37.3
% Male	43.0	<b>Dual status<sup>+</sup></b>	
% Female	57.0	% enrolled Medicare/Medicaid	9.1
<b>Race/Ethnicity<sup>*</sup></b>		<b>HCC Risk Score<sup>+</sup></b>	
% American Indian/Alaska Native	0.9	Average HCC Risk Score	1.0
% Asian	2.3	<b>Diagnoses in past year (FFS only)<sup>b</sup></b>	
% Black/African-American	6.8	% Diabetes without complication	35.7
% Native Hawaiian/Pacific Islander	0.2	% Cardiac dysrhythmias/arrest	27.8
% White	88.6	% Heart disease	22.9
% Multi-race	1.1	% COPD/asthma	20.5
% Hispanic <sup>a</sup>	5.4	<b>Prior Year Services (FFS only)<sup>b</sup></b>	
<b>Urban/rural status<sup>+</sup></b>		Mean office visits	8.55

<sup>11</sup> Morisky DE, Green LW, Levine DM. (1986). Concurrent and Predictive Validity of a Self-Reported Measure of Medication Adherence. *Med Care*. 24(1):67-74.

<sup>12</sup> Response rates take into account ineligibility due to death and institutionalization.

Demographics		Medicare Enrollment and Claims	
% Urban	74.7	% 0 hospital stays	85.1
% Rural and other	25.3	% 1 hospital stay	11.0
<b>Annual Household Income*</b>		% 2+ hospital stays	3.93
% less than \$20,000	23.1	% 0 ER visits	78.4
% \$20,000-\$39,999	28.4	% 1 ER visit	14.9
% \$40,000 or more	48.5	% 2+ ER visits	6.7
<b>Education*</b>		<b>Expenditures (FFS only)<sup>b</sup></b>	
% less than high school	13.8	Average Total A/B cost	\$6,650
% high school graduate	31.7	Average IP cost	\$1,717
% some college/2 year degree	26.2	Average Part D cost	\$2,751
% 4 year college grad or higher	28.2	Average ER cost	\$186

<sup>+</sup> Characteristics are identified through Medicare enrollment data; CMS-HCC risk scores from Risk Adjustment System (RAS) data. The population for this characteristic includes the 9,198 respondents who have at least one year of continuous enrollment in Medicare and who are at least 66 years old.

<sup>\*</sup> Characteristics are identified through baseline national survey data. The population for this characteristic includes all 9,203 respondents to the baseline national survey.

<sup>a</sup> Hispanic ethnicity is identified separately from race, and therefore percentages within the Race/Ethnicity category do not sum to 100 percent.

<sup>b</sup> Respondents must have at least one year of continuous enrollment in Medicare FFS (A/B) and must be at least 66 years old (N=5,765).

### 2.1.3 Participant Survey Fielding and Matched Sample Characteristics

The Acumen team surveyed wellness program participants using self-administered questionnaires that were distributed during initial enrollment in the program. Table 2.3 shows the number of returned surveys by wellness program and priority area, after excluding individuals who did not meet the age eligibility criteria for the study (66 or older).

**Table 2.3: Baseline Survey Participant Respondents by ACA Priority Area and Wellness Program**

ACA Priority Area	Count and Percentage of Surveys by Priority Area	Count and Percentage of Surveys by Wellness Program	
Chronic Disease Management (CDM)	1,493 (21.3%)	CDSMP	842 (12.0%)
		DSMP	651 (9.3%)
Physical Activity, Nutrition, and Obesity (PANO)	1,881 (26.9%)	EnhanceFitness	900 (12.9%)
		Fit & Strong!	981 (14.0%)
Falls Prevention (FP)	3,623 (51.8%)	A Matter of Balance	1,342 (19.2%)
		Stepping On	2,281 (32.6%)

Note: The total number of baseline surveys returned was 6,997.

Source: Baseline wellness program participant survey

The baseline national and participant survey responses were used to construct matched samples for the impact analysis. The Acumen team used responses to the national baseline survey, as well as Medicare claims and enrollment data, to identify a comparison group of beneficiaries with a similar proclivity to enroll in a wellness program. After the pool of potential comparison beneficiaries was identified for each ACA priority area, propensity score matching was used to identify pairs of national survey and Wellness program participants who were similar along many relevant dimensions in the baseline period. These dimensions included demographics, medical conditions, health service utilization, and medical expenditure, as recorded in Medicare claims data, as well as various self-reported measures of socio-economic status, health outcomes, and health behaviors, as recorded in the baseline national and participant surveys. Matching was conducted independently for each ACA priority area. More information about the matching methodology can be found in Appendix E.

Table 2.4 shows selected characteristics of the matched samples by ACA priority area at baseline. Overall, the samples are well matched with few statistically significant differences between wellness program participants and their comparators. One exception is the percentage living in urban areas, where participants and comparators differed significantly in all three program areas. Though statistically different, the majority of participants and comparators lived in urban areas across the three priority areas. In addition, PANO participants tend to be wealthier, better educated, and less likely to have dual eligibility status. However, these characteristics are not likely to change over time, and the permanent effects of these characteristics on evaluation outcomes are taken into account by the difference-in-difference estimates. The difference-in-difference specifications, discussed in more detail in Section 2.4, assume that these characteristics do not affect trends in outcomes over the course of the follow-up period. As a robustness check, Acumen included covariates for urban/rural status, dual eligibility, income, and education, as well as other demographic characteristics in some difference-in-difference models estimating the effect of PANO programs on beneficiary outcomes.<sup>13</sup> PANO programs were selected because matched samples for this priority area showed the largest baseline imbalance in characteristics between participants and their comparison group. The empirical results outlined in Section 4 were unchanged when covariates were included in the difference-in-difference models.

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<sup>13</sup> Specifically, Acumen tested the inclusion of covariates in all models where unadjusted difference-in-difference specifications estimated a statistically significant effect of PANO programs. The outcomes of interest were the following: SF-36 Social Functioning Subscale, SF-36 Role Emotional Subscale, RAPA Aerobic Subscale, and RAPA Strength/Flexibility Subscale (see Section 4.1.2 for more details).

**Table 2.4: Selected Characteristics of the Matched Samples at Baseline**

Group	ACA Priority Area					
	CDM		PANO		FP	
	Part. N=920	Comp. N=920	Part. N=1,046	Comp. N=1,046	Part. N=2,013	Comp. N=2,013
<b>Average Age<sup>a</sup></b>	75.0	75.2	74.4	74.5	77.4	77.2
<b>% Female<sup>a</sup></b>	78.3	78.3	82.5	82.5	75.9	75.9
<b>Race/ethnicity<sup>b</sup></b>						
% American Indian/Alaska Native	0.2	0.5	0.6	0.7	0.9	0.6
% Asian	0.5	0.5	2.0	1.6	0.7	0.8
% Black/African American	23.6	23.3	15.4	15.0	5.4	5.6
% Native Hawaiian/ Pacific Islander	0.1	0.0	0.1	0.2	0.1	0.3
% White	75.1	74.9	81.2	80.9	92.1	92.0
% Multi-race	0.5	0.8	0.6	1.6	0.8	0.8
% Hispanic <sup>c</sup>	6.0	5.9	6.0	5.9	6.3	6.2
<b>% Urban<sup>a</sup></b>	72.8	77.5**	85.5	77.2***	72.4	76.7***
<b>% Dual<sup>a</sup></b>	16.7	17.3	6.1	9.6***	11.0	10.2
<b>Income<sup>b</sup></b>						
% less than \$20,000	38.6	40.6	22.6	27.3*	29.2	28.9
% \$20,000-\$39,999	24.9	25.5	28.2	27.5	29.4	29.2
% \$40,000 or more	36.5	34.0	49.2	45.2	41.3	41.8
<b>Educational attainment<sup>b</sup></b>						
% less than high school	15.3	16.9	7.9	12.3**	8.6	7.9
% high school graduate	28.5	30.0	25.6	25.1	30.8	31.8
% some college/2 year degree	33.1	30.5	32.8	32.5	28.7	29.5
% 4 year college graduate or higher	23.1	22.7	33.6	30.2	31.8	30.8
<b>Average HCC risk score<sup>a</sup></b>	1.2	1.3	0.9	0.9	1.1	1.1
<b>Average Number of Office Visits (FFS Only)<sup>d</sup></b>	10.8	10.3	8.5	8.1	10.0	10.0
<b>Hospitalization Rate (FFS Only)<sup>d</sup></b>						
% 0 Stays	83.5	83.9	88.9	89.2	85.0	84.3
% 1 Stay	12.8	12.4	7.6	6.7	11.3	11.7
% 2+ Stays	3.8	3.8	3.5	4.0	3.7	4.0
<b>ER Visit Rate (FFS Only)<sup>d</sup></b>						
% 0 ER Visits	72.8	72.0	80.3	78.5	72.7	74.7
% 1 ER Visit	18.0	17.3	14.1	16.3	18.8	17.8
% 2+ ER Visits	9.2	10.7	5.5	5.2	8.5	7.5

<sup>a</sup> Characteristics are identified through Medicare enrollment data; CMS-HCC risk scores from RAS. The population for this characteristic includes respondents who have at least one year of continuous enrollment in Medicare and who are at least 66 years old.

<sup>b</sup> Characteristics are identified through baseline national and participant survey data. The population for this characteristic includes all matched respondents to the baseline national survey.

<sup>c</sup> Hispanic ethnicity is identified separately from race, and therefore percentages within the Race/Ethnicity category do not sum to 100 percent.

<sup>d</sup> Respondents must have at least one year of continuous enrollment in Medicare FFS (A/B) and must be at least 66 years old.

Notes: Wellness program participants are denoted with “Part.” while comparison group members are denoted with “Comp.” Asterisks indicate statistically significant differences from matched participants in the ACA priority area.

\*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

## 2.2 Six Month Surveys and Nonresponse Weighting

Surveys were fielded by mail to each individual in the matched samples at six months. Not everyone in the participant and comparison samples responded to the six-month follow-up surveys, due to death and institutionalization as well as survey refusal. Table 2.5 shows the survey completion rate for the matched samples in each ACA priority area. Seventy to more than 80 percent of matched sample respondents completed a six-month survey.

**Table 2.5: Follow-Up Survey Sample Disposition for the Matched Samples**

Group	Starting Sample	Survey Completes	Survey Completion Rate**
<b>CDM</b>			
National Respondents	920	734	79.8%
Participant Respondents	920	641	69.7%
<b>PANO</b>			
National Respondents	1,046	850	81.3%
Participant Respondents	1,046	764	73.0%
<b>FP</b>			
National Respondents	2,013	1,628	80.9%
Participant Respondents	2,013	1,471	73.1%

\*\* Completes/Starting sample

Table 2.6 shows the characteristics of those in the matched samples who responded to the 6-month follow-up survey. Overall, there is very little change in the distribution of key sample characteristics due to survey nonresponse. The samples remain well matched on most characteristics, with similar significant differences as found at baseline.

**Table 2.6: Selected Characteristics of the Matched Samples at Baseline, Among All Respondents at Six Months**

Group	ACA Priority Area					
	CDM		PANO		FP	
	Part. N=641	Comp. N=734	Part. N=764	Comp. N=850	Part. N=1,471	Comp. N=1,628
<b>Average Age<sup>a</sup></b>	74.6	75.2**	74.3	74.5	77.2	77.2
<b>% Female<sup>a</sup></b>	78.0	78.3	82.9	83.2	77.0	75.2
<b>Race/ethnicity<sup>b</sup></b>						
% American Indian/Alaska Native	0.2	0.4	0.6	0.4	0.9	0.6
% Asian	0.5	0.3	2.0	1.7	0.7	0.7
% Black/African American	20.6	22.9	14.9	15.0	4.8	5.2
% Native Hawaiian/ Pacific Islander	0.0	0.0	0.1	0.3	0.1	0.3
% White	78.3	75.8	81.6	81.3	92.8	92.4
% Multi-race	0.5	0.6	0.7	1.4	0.7	0.7
% Hispanic <sup>c</sup>	4.9	5.4	4.1	5.4	4.5	6.1*
<b>% Urban<sup>a</sup></b>	70.5	79.0***	85.2	77.6***	71.1	76.4***
<b>% Dual<sup>a</sup></b>	14.4	16.3	5.2	7.6**	9.2	9.2
<b>Income<sup>b</sup></b>						
% less than \$20,000	37.6	39.2	20.4	27.0**	25.9	27.7
% \$20,000-\$39,999	25.1	25.1	27.2	27.1	30.5	29.2
% \$40,000 or more	37.3	35.7	52.4	45.9	43.6	43.1

Group	ACA Priority Area					
	CDM		PANO		FP	
	Part. N=641	Comp. N=734	Part. N=764	Comp. N=850	Part. N=1,471	Comp. N=1,628
<b>Educational attainment<sup>b</sup></b>						
% less than high school	11.3	14.4	6.9	11.4***	6.7	6.9
% high school graduate	28.2	31.0	24.1	25.6	30.6	32.5
% some college/2 year degree	35.1	30.6	32.3	31.1	29.3	28.6
% 4 year college graduate or higher	25.4	24.0	36.7	31.9	33.4	32.0
<b>Average HCC risk score<sup>a</sup></b>	1.2	1.2	0.8	0.9	1.1	1.1
<b>Average Number of Office Visits (FFS Only)<sup>d</sup></b>	11.2	10.5	8.3	8.0	9.7	9.9
<b>Hospitalization Rate (FFS Only)<sup>d</sup></b>						
% 0 Stays	85.0	83.8	89.6	89.2	86.5	84.8
% 1 Stay	11.0	13.2	6.8	6.9	10.7	11.5
% 2+ Stays	4.0	3.0	3.6	3.9	2.8	3.7
<b>ER Visit Rate (FFS Only)<sup>d</sup></b>						
% 0 ER Visits	75.7	73.2	82.2	80.1	73.2	75.6
% 1 ER Visit	16.0	16.5	13.1	14.6	18.3	17.6
% 2+ ER Visits	8.3	10.3	4.7	5.3	8.5	6.8

<sup>a</sup> Characteristics are identified through Medicare enrollment data; CMS-HCC risk scores from RAS. The population for this characteristic includes respondents who have at least one year of continuous enrollment in Medicare and who are at least 66 years old.

<sup>b</sup> Characteristics are identified through baseline national and participant survey data. The population for this characteristic includes all matched respondents to the baseline national survey.

<sup>c</sup> Hispanic ethnicity is identified separately from race, and therefore percentages within the Race/Ethnicity category do not sum to 100 percent.

<sup>d</sup> Respondents must have at least one year of continuous enrollment in Medicare FFS (A/B) and must be at least 66 years old.

Notes: Wellness program participants are denoted with “Part.” while comparison group members are denoted with “Comp.” Asterisks indicate statistically significant differences from matched participants in the ACA priority area. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

To adjust for any bias due to differential nonresponse at six months between participants and their comparators, nonresponse adjustment weights were used to correct and re-balance the two independent samples. For weighting purposes, each matched sample was treated as a census. Both the weighting and analytic strategies treat the matched samples as having independent national and participant components which vary in size over time.<sup>14</sup>

### 2.3 Analysis of Readiness for Participation in a Wellness Program

To provide CMS with a national estimate of beneficiary readiness to participate in a wellness program, the Acumen team used the responses from the full baseline national survey sample to develop a *composite readiness index*. The composite readiness index captures:

- The likelihood of enrolling in a wellness program in the next six months
- Stages of behavior change: each respondent was classified into one of four mutually exclusive stages of change (pre-contemplation, contemplation, preparation, or action) for

<sup>14</sup> Schafer, J.L., and Kang, J. (2008). Average causal effect from nonrandomized studies: A practical guide and simulated example. *Psychological Methods*, 13, 279-313.

each of five behaviors (improving diet, managing weight, exercising for health, exercising for balance, and managing chronic health conditions) relevant to the six wellness programs

Details of the index and its development are available in Appendix F.

The composite readiness index score ranges from 2 to 8, and a score of 6 or higher was used to indicate readiness for engaging in a wellness program. Individuals meeting a threshold of 6 on the composite index have a good chance of both program enrollment and success in the program based on their readiness to change behaviors.

In addition to measuring Medicare beneficiaries' readiness for participation in a wellness program, we also looked characteristics correlated with likelihood to engage in such programs. Based on the extant literature, we expected readiness to be positively correlated with higher levels of self-efficacy, better self-reported health, higher levels of education, higher levels of social support, lower levels of depression, the presence of chronic health conditions, and the receipt of physician advice to change.<sup>15</sup> In addition to these factors, we hypothesized that several survey items may serve as facilitators and barriers to program participation in our population. Specifically, beneficiaries with awareness of and prior participation in wellness program may be more ready for participation in a future wellness program because of this knowledge and experience. Conversely, beneficiaries with transportation difficulty, lack of English proficiency, or those who live alone may face additional barriers to participation. We investigated the following five categories of predictors:

- Demographics: gender, race/ethnicity, age
- Social engagement: awareness, prior participation in wellness program
- Barriers to change: Lack of English proficiency, living alone, education level, social support, transportation difficulty
- Facilitators for change: self-efficacy, patient activation, physician recommendation
- Indicators of need: BMI, chronic conditions (arthritis, diabetes, prediabetes, depression), general health, current smoker

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<sup>15</sup> Marcus, B., Selby, V., Niaura, R., & Rossi, J. (1992). Self-efficacy and the stages of exercise behavior change. *Research Quarterly for Exercise and Sport*, 63, 60-66;

Johnson, N., & Johnson, D. (2013). Correlates of readiness to change in victims of intimate partner violence. *Journal of Aggressive Maltreatment Trauma*, 22, 127-144;

Daoud, N., Hayek, S., Muhammad, A., et al. (2015). Stages of change of the readiness to quit smoking among a random sample of minority Arab-male smokers in Israel. *BMC Public Health*, 15, 672;

Garber, C., Allsworth, J., Marcus, B. et al. (2008). Correlates of the stages of change for physical activity in a population survey. *American Journal of Public Health*, 98, 897-904;

Rose, K., Gitlin, L., & Dennis, M. (2010). Readiness to use compensatory strategies among older adults with functional disabilities. *International Psychogeriatrics*, 22, 1225-1239;

Douglas, B. & Howard, E. (2015). Predictors of self-management behaviors in older adults with hypertension. *Advances in Preventive Medicine*, 2015: 6.

The national estimates of beneficiary readiness to participate in a wellness program are reported in Section 3, along with analysis of potential readiness predictors.

## 2.4 Impact of Wellness Program Participation at Six Months

The Acumen team used matched sample survey responses to assess program impacts on changes in self-reported health outcomes (e.g., quality of life, physical activity, falls and balance problems, medication adherence) at six months. The impact analysis is based on a quasi-experimental design using a difference-in-difference (DiD) estimation approach, where the average change between the baseline and six-month post-enrollment outcomes among wellness program participants is compared to the average change between the baseline and six month post-enrollment outcomes among the matched comparison group. The wellness program participants included in these analyses are those who responded to the initial and 6-month follow-up surveys. Group means and DiD estimates were weighted to account for nonresponse to the follow-up survey. Standard errors were generated using jackknife variance estimation, a common resampling procedure for complex survey designs.<sup>16</sup>

Two sets of DiD analyses were performed for each outcome measure. The first is an *intention to treat* (ITT) analysis including all matched sample respondents to the six month survey (sample described above in Table 2.6). This sample includes participant respondents who attended wellness programs (and their matched comparators), regardless of whether or not they completed their programs. Wellness program completion status was based on attendance records submitted by the programs and used the thresholds defined in Table 2.7.

**Table 2.7: Definitions of Wellness Program Participation and Completion**

Wellness Program	Class Frequency	Definition of Participation	Definition of Completion <sup>a</sup>
CDSMP	1 class a week for 6 weeks	Attends at least 1 of 6 classes	Attends 4 of 6 classes
DSMP	1 class a week for 6 weeks	Attends at least 1 of 6 classes	Attends 4 of 6 classes
EF	2-3 times a week; ongoing	Attends at least 1 class per year	No official definition of completion because the class is ongoing; however, attendance at 2 out of 3 classes per week for at least 4 months is recommended
F&S!	3 times a week for 8 weeks	Attends at least 1 of 24 classes	Attends 18 of 24 classes
MOB	1 class per week for 8 weeks or 2 classes per week for 4 weeks	Attends at least 1 of 8 classes	Attends 5 of 8 classes
SO	1 class per week for 7 weeks	Attends at least 1 of 7 classes	Attends 5 of 7 classes

<sup>a</sup> Based on national program definitions

As a sensitivity test, a second set of DiD analyses was performed on those wellness program participants who completed the program and their matched comparators, reflecting an

<sup>16</sup> Wolter, K.M. 2007. *Introduction to Variance Estimation*. Springer: New York.

average treatment effect among the treated (ATT) analysis. This analysis reflects the impact of program participation among those who met the definition of wellness program completion, providing a standardized “dose” of the intervention across respondents. Table 2.8 shows the characteristics of the matched ATT samples within each ACA priority area. The samples remain well-matched when program non-completers (and their comparators) are excluded, with similar significant differences across characteristics as the ITT and baseline samples.

**Table 2.8: Selected Characteristics of the Matched Samples at Baseline, Among Program Completers Who Responded at Six Months (Average Treatment Effect Among the Treated Sample)**

Group	ACA Priority Area					
	CDM		PANO		FP	
	Part. N=545	Comp. N=612	Part. N=557	Comp. N=607	Part. N=1,287	Comp. N=1,397
<b>Average Age<sup>a</sup></b>	74.6	75.2	74.2	74.5	77.1	77.0
<b>% Female<sup>a</sup></b>	78.9	78.9	81.1	82.5	77.4	75.4
<b>Race/ethnicity<sup>b</sup></b>						
% American Indian/Alaska Native	0.2	0.5	0.4	0.4	1.0	0.7
% Asian	0.6	0.2	2.0	2.1	0.8	0.7
% Black/African American	21.7	24.6	12.3	12.3	4.6	5.2
% Native Hawaiian/ Pacific Islander	0.0	0.0	0.2	0.2	0.1	0.3
% White	77.1	74.0	84.5	83.8	92.8	92.4
% Multi-race	0.4	0.7	0.6	1.2	0.7	0.7
% Hispanic <sup>c</sup>	5.0	4.6	3.7	4.8	4.4	6.4**
<b>% Urban<sup>a</sup></b>	71.0	78.9***	85.6	77.9***	70.8	76.2***
<b>% Dual<sup>a</sup></b>	14.1	17.8	3.6	7.1**	8.6	9.0
<b>Income<sup>b</sup></b>						
% less than \$20,000	38.7	40.6	16.4	25.4***	25.5	26.8
% \$20,000-\$39,999	23.8	24.9	24.9	26.1	30.7	30.3
% \$40,000 or more	37.5	34.5	58.9	48.5	43.8	42.9
<b>Educational attainment<sup>b</sup></b>						
% less than high school	12.3	14.7	4.8	11.4	6.3	6.8
% high school graduate	27.9	29.1	23.5	25.7	30.6	32.3
% some college/2 year degree	34.7	32.2	31.1	30.3	29.3	29.1
% 4 year college graduate or higher	25.0	24.0	40.6	32.6***	33.8	31.8
<b>Average HCC risk score<sup>a</sup></b>	1.1	1.2**	0.8	0.8	1.0	1.1
<b>Average Number of Office Visits (FFS Only)<sup>d</sup></b>	11.0	10.6	8.2	8.0	9.5	9.9
<b>Hospitalization Rate (FFS Only)<sup>d</sup></b>						
% 0 Stays	86.8	83.4	91.2	89.5	86.4	85.3
% 1 Stay	9.7	14.0	6.4	6.2	10.8	11.2
% 2+ Stays	3.5	2.6	2.4	4.3	2.8	3.5
<b>ER Visit Rate (FFS Only)<sup>d</sup></b>						
% 0 ER Visits	77.1	73.1	84.2	80.8	74.2	76.2
% 1 ER Visit	15.2	15.2	12.2	13.8	17.7	16.9
% 2+ ER Visits	7.7	11.7	3.6	5.4	8.1	6.9

<sup>a</sup> Characteristics are identified through Medicare enrollment data; CMS-HCC risk scores from RAS. The population for this characteristic includes respondents who have at least one year of continuous enrollment in Medicare and who are at least 66 years old.

<sup>b</sup> Characteristics are identified through baseline national and participant survey data. The population for this characteristic includes all matched respondents to the baseline national survey.

<sup>c</sup> Hispanic ethnicity is identified separately from race, and therefore percentages within the Race/Ethnicity category do not sum to 100 percent.

<sup>d</sup> Respondents must have at least one year of continuous enrollment in Medicare FFS (A/B) and must be at least 66 years old.

Notes: Wellness program participants are denoted with “Part.” while comparison group members are denoted with “Comp.” Asterisks indicate statistically significant differences from matched participants in the ACA priority area. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

The Acumen team found that ATT results were largely consistent with ITT results. The ATT DiD results are highlighted in Section 4 and Appendix G, and the ITT results are shown in Appendix H along with a table comparing the demographic characteristics of program completers and non-completers.<sup>17</sup>

## **2.5 Analysis of Estimated Operational Costs to Deliver Wellness Programs**

Operational costs of wellness programs were estimated through an environmental scan and primary data collection from implementation sites. Estimated annual operational costs were collected from 11 relatively large organizations with long-term experience delivering wellness programs.<sup>18</sup> Operational costs included the following categories:

- direct labor and contract employees,
- workforce development activities,
- supplies and equipment, and
- administrative and other miscellaneous costs (e.g., participant incentives, photocopies, administrative or overhead costs not included in the categories listed above).

The Acumen team provided a cost data collection worksheet to organizations for cost reporting purposes, and spoke with each of these organizations to review their cost data and respond to questions. In an effort to minimize burden on organizations, Acumen also accepted pre-existing cost information and tools to project costs that were developed for other purposes. These data were used to calculate estimated operational costs per participant and per program completer. For organizations that provided projected costs, maximum enrollment for the wellness program workshops was assumed to generate a conservative estimate of costs per participant.

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<sup>17</sup> Not all programs defined completion. We therefore defined “non-completers” (among programs with thresholds) vs. completers and participants attending programs without completion thresholds. We use the phrase “completers” to refer to this latter group.

<sup>18</sup> The Acumen team engaged the national leaders of wellness programs and key stakeholders in discussions regarding challenges in cost data collection. Stakeholders reported that larger organizations with mature wellness program operations were most likely to have reliable cost data.

The results of these cost analyses are reported in Section 5. Because data were not collected from small organizations or organizations with less mature program operations, the generalizability of these results is limited.

To provide additional context for interpreting estimates of operational costs of the specific wellness programs participating in the study, the Acumen team conducted a brief environmental scan of peer-reviewed literature published within the past 10 years, Web sites, and grey literature. Acumen also had conversations with national leaders of the wellness programs and key stakeholders at the Administration for Community Living/Administration on Aging (ACL/AoA).

### 3 READINESS TO PARTICIPATE IN WELLNESS PROGRAMS

This section describes results from the national baseline survey related to beneficiary readiness to engage with wellness programs (Research Question 1). Section 3.1 presents key findings from the analysis, including the overall estimate of readiness to engage with wellness programs and predictors of readiness. Section 3.2 presents our conclusions about potential mechanisms for increasing readiness for wellness program participation among Medicare beneficiaries.

#### 3.1 Key Findings

Overall, 24 percent of respondents to the national baseline survey were classified as ready to engage with a wellness program.

Respondents' readiness to engage in a wellness program varied across demographic characteristics, as shown below in Table 3.1. Beneficiaries who were ready for wellness program participation were younger; sixty percent of ready respondents were age 66-74, compared with only forty-nine percent of respondents who were not ready. Ready respondents were more likely to be nonwhite and Hispanic compared to non-ready responders. Notably, nearly twelve percent of ready respondents were Black, compared with only five percent of respondents who were not ready. Ready respondents were also more likely to be female compared with their counterparts who were not ready.

**Table 3.1: Demographics of the National Baseline Sample by Readiness to Engage in Wellness Programs**

Demographic Category	Ready for Wellness Program 24.4% (N=2,175)	Not Ready for Wellness Program 75.6% (N=6,511)	Full Sample 100% (N=8,686)
<b>Age***</b>			
66-74	60.0	48.9	51.6
75-84	32.8	36.3	35.4
85 and older	7.2	14.8	12.9
<b>Race***</b>			
American Indian/Alaska Native	1.2	0.8	0.9
Asian	2.7	2.2	2.3
Black/African American	11.9	4.9	6.6
Native Hawaiian/Other Pacific Islander	0.5	0.2	0.3
White	82.6	90.7	88.8
Multi-race	1.1	1.1	1.1
<b>Ethnicity***</b>			
Hispanic	7.1	4.9	5.4
Not Hispanic	92.9	95.1	94.6
<b>Gender***</b>			
Female	63.7	54.6	56.8
Male	36.3	45.4	43.2

Source: National baseline survey of Medicare beneficiaries.

Notes: Hispanic ethnicity is identified separately from race. Missing data are not included in the percentages reported. Significance tested with chi-square using replicate weights. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

Awareness and prior participation in a wellness program were strongly related to respondent readiness to participate in a wellness program in the future (Table 3.2). Most notably, more than a third of ready respondents (36.5%) had previously participated in a wellness program (vs. thirteen percent of respondents who were not ready).

**Table 3.2: Awareness and Prior Participation of the National Sample by Readiness to Engage in Wellness Programs**

Demographic Category	Ready for Wellness Program 24.4% (N=2,175)	Not Ready for Wellness Program 75.6% (N=6,511)	Full Sample 100% (N=8,686)
<b>Awareness of Wellness Programs***</b>			
Aware of programs in community/online	60.9	45.7	49.4
Not aware	39.1	54.3	50.6
<b>Prior participation in a Wellness Program***</b>			
Participated in past two years	36.5	12.8	18.6
Did not participate in past two years	63.5	87.2	81.4

Source: National baseline survey of Medicare beneficiaries.

Notes: Missing data are not included in the percentages reported. Significance tested with chi-square using replicate weights. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

Factors that might present barriers to engagement in a wellness program are shown in Table 3.3. In general, differences between ready and not ready respondents were slight. Ready respondents were more likely to have completed high school, and they were less likely to have difficulty with transportation. The factors of living alone and having limited English proficiency were not statistically different between ready and not ready respondents. Interestingly, the mean value of our social support scale<sup>19</sup> is significantly lower among those who are ready. Though the difference is small, it may signal additional social needs among those who are ready for behavior change and program participation, or it may suggest that those with more social support are having their wellness needs met outside the context of a wellness program.

<sup>19</sup> Social support is measured with items from the RAND MOS Social Support Survey’s “tangible support” domain. The items reflect the extent to which respondents would have assistance with daily life if they needed it. See Sherbourne, C. and Stewart, A. (1993). The MOS Social Support Survey. Santa Monica, CA: RAND Corporation. <http://www.rand.org/pubs/reprints/RP218.html>.

**Table 3.3: Barriers to Change for the National Sample by Readiness to Engage in Wellness Programs**

Demographic Category	Ready for Wellness Program 24.4% (N=2,175)	Not Ready for Wellness Program 75.6% (N=6,511)	Full Sample 100% (N=8,686)
<b>Educational Attainment***</b>			
Less than high school	10.9%	14.6%	13.7%
High school graduate	30.7%	32.1%	31.7%
Some college/2 year degree	31.5%	24.7%	26.4%
4 year college graduate or higher	26.9%	28.6%	28.2%
<b>Other Characteristics</b>			
Living alone	28.8%	27.4%	27.7%
Difficulty with transportation*	10.6%	12.1%	11.7%
Difficulty with English	2.7%	2.9%	2.9%
<b>Social Support Scale (Mean)***</b>	14.8	15.4	15.3

Source: National baseline survey of Medicare beneficiaries.

Notes: Missing data are not included in the percentages reported. Significance tested with chi-square using replicate weights. A t-test was used to test for mean differences for social support. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

Facilitators for change, shown in Table 3.4, were more strongly related to readiness than were barriers to change. Self-efficacy<sup>20</sup>, patient activation<sup>21</sup>, and receipt of a physician recommendation for behavior change were all powerful predictors of readiness to engage in a wellness program (Table 3.4). Among the strongest predictors of readiness is a physician recommendation for behavior change, including recommendations around healthful eating, exercise, and weight management. About eighty-six percent of ready respondents had received such a recommendation, compared with only sixty-four percent of respondents who were not ready. The percentage of respondents with low levels of self-efficacy is nearly twice as high among those who are not ready.

<sup>20</sup> The New General Self-Efficacy (NGSE) scale contains eight items measuring an individual’s capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands. See Chen, G., Gully, S., Eden. D. (2001). Validation of a New General Self-Efficacy Scale. *Organizational Research Methods* 4:62.

<sup>21</sup> Patient activation was measured with two items from the Medicare Current Beneficiary Survey. These items were validated by Williams and Heller (2007) and found to reliably discriminate between beneficiaries who take a proactive role in managing their health care and those who are more passive. See Williams, S. and Heller, A. (2007). Patient Activation among Medicare Beneficiaries: Segmentation to Promote Informed Health Care Decision Making, *International Journal of Pharmaceutical and Healthcare Marketing*, 1(3), 199 – 213.

**Table 3.4: Facilitators for Change for the National Sample by Readiness to Engage in Wellness Programs**

Health Management Outcomes	Ready for Wellness Program 24.4% (N=2,175)	Not Ready for Wellness Program 75.6% (N=6,511)	Full Sample 100% (N=8,686)
<b>Self-Efficacy***</b>			
Low	5.0	9.6	8.5
Below average	8.7	10.3	9.9
Average	28.2	27.5	27.7
Above average	33.8	28.7	29.9
High	24.3	23.9	24.0
<b>Patient Activation***</b>			
Active	51.8	47.5	48.6
High effort	25.2	34.3	34.3
Complacent	7.0	9.2	8.7
Passive	6.9	8.9	8.4
<b>Physician Recommendation***</b>			
Received	86.0	63.5	69.2
Not received	14.0	36.5	30.8

Source: National baseline survey of Medicare beneficiaries.

Notes: Missing data are not included in the percentages reported. Significance tested with chi-square using replicate weights. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

Table 3.5 shows health status variables that we conceptualized as indicators of need for participation in a wellness program. With the exception of smoking, all results in the table suggest that readiness for participation was significantly higher among those who would most benefit from a wellness program. The Short Form-36 (SF-36<sup>22</sup>) measures of overall physical and mental health are lower among those who are ready, although the differences are very small. Body Mass Index is higher among those who are ready, and ready respondents are more likely to have chronic conditions including arthritis, diabetes, and pre-diabetes. Perhaps not surprisingly, ready respondents are less likely to be current smokers.

**Table 3.5: Indicators of Need for the National Sample by Readiness to Engage in Wellness Programs**

Health Status Category	Ready for Wellness Program 24.4% (N=2,175)	Not Ready for Wellness Program 75.6% (N=6,511)	Full Sample 100% (N=8,686)
<b>SF-36 Physical Components (Mean)***</b>	43.1	43.9	43.7
<b>SF-36 Mental Components (Mean)**</b>	51.8	52.3	52.2

<sup>22</sup> Two upper-level component summary scores were created based on factor analysis with data collected using the 36 questions drawn from the Optum™ SF-36v2® Health Survey. The 36 questions were designed to measure functional health and well-being from the respondent's point of view. Each measure has been standardized to SF-36 population averages and transformed to range from 1-100 with a mean of 50. See <https://campaign.optum.com/content/optum/en/optum-outcomes/what-we-do/health-surveys/sf-36v2-health-survey.html> and QualityMetric Health Outcomes™ Scoring Software 4.5 User's Guide (2004, 2007, 2009, 2010, 2011) for more technical details.

<b>Health Status Category</b>	<b>Ready for Wellness Program 24.4% (N=2,175)</b>	<b>Not Ready for Wellness Program 75.6% (N=6,511)</b>	<b>Full Sample 100% (N=8,686)</b>
<b>Chronic Conditions</b>			
% with arthritis***	67.2%	58.7%	60.8%
% with diabetes***	29.1%	19.5%	21.9%
% with pre-diabetes***	13.3%	8.7%	9.8%
<b>Body Mass Index (Mean)***</b>	29.1	27.1	27.6
<b>% current smoker***</b>	4.6%	7.5%	6.8%

Source: National baseline survey of Medicare beneficiaries.

Notes: Missing data are not included in the percentages reported. Significance tested with chi-square using replicate weights. A t-test was used to test for mean differences for SF-36 scores and body mass index. \*p< 0.10; \*\*p< 0.05; \*\*\*p< 0.01.

### 3.2 Discussion and Conclusions

About a quarter of Medicare beneficiaries are ready to engage with wellness programs based on our composite readiness index. This is important for understanding the likely demand for these programs in the future, which may assist in planning for expansion of wellness programs or benefit offerings for Medicare beneficiaries. The key facilitators for change identified in this section, particularly physician recommendations, self-efficacy, patient activation, and prior program participation and awareness of programs, suggest possible subgroups that may be ideal for targeted outreach and mechanisms for generating interest in wellness programs. Lastly, potential barriers to participation in a wellness program were less strongly related to readiness, suggesting that a focus on facilitators may yield greater enrollment in wellness programs.

## 4 EFFECT OF WELLNESS PROGRAMS ON SELF-REPORTED BEHAVIORS AND HEALTH OUTCOMES

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This section describes findings from an analysis designed to address a portion of *Research Question 2*: What is the impact of beneficiary participation in wellness programs on subsequent health behaviors and self-reported health outcomes? The analysis used baseline and six-month follow-up survey results for participant survey respondents and their matched national survey comparators. The discussion in this section focuses on the average treatment effect among the treated (ATT) analysis results, with intention to treat (ITT) results shown in Appendix H. In Section 4.1 we provide difference in differences (DiD) estimates for each outcome and program type, along with graphs highlighting statistically significant DiD estimates. Section 4.2 presents our conclusions about program impact at six months on the self-reported outcomes collected through our surveys.

### 4.1 Difference-in-Difference Estimates

This section presents DiD estimates for the three program types, along with the respective changes over 6 months among participants and their comparators. The bar charts illustrate how the estimates of change for participants and the comparison group work together to create the statistically significant DiD estimates. Each bar chart is accompanied by a table of all outcomes showing the group means at each time point, the ninety percent confidence interval of the DiD estimate, and the relative difference, which is the DiD estimate as a percentage of the treatment group baseline period mean.

#### How to Interpret the DiD Charts

Each bar chart shows six month changes in each outcome:

- in brown stripe  for the comparison group
- in blue stripe  for the participants
- in teal  for the difference of comparison group change and the participant change

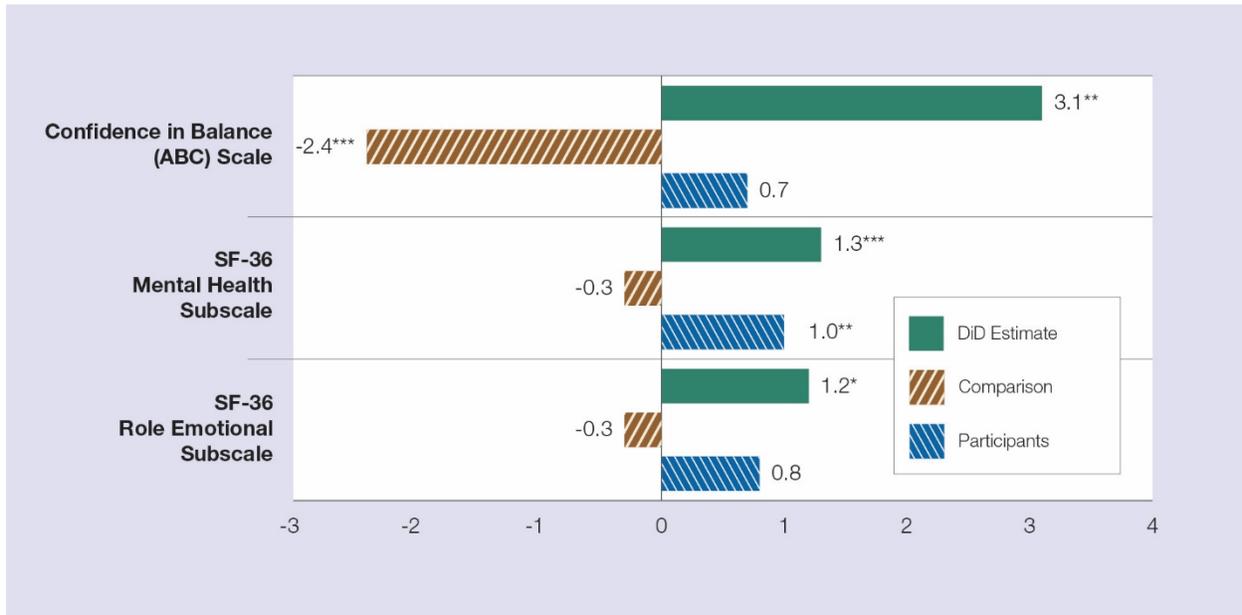
Values above zero represent improvements in each outcome, while values below zero reflect deterioration.

#### 4.1.1 Chronic Disease Management Programs

Chronic disease management (CDM) program participants improved in three areas relative to their comparators: confidence in balance, the SF-36 mental health subscale, and the SF-36 role emotional subscale (also a mental well-being measure). As shown in Figure 4.1, improvements among participants are paired with declines among members of the comparison group. This is especially notable for confidence in balance, where comparators declined

significantly and participants maintained at baseline levels. The DiD estimate of 3.1 is calculated as the difference between the participant group change (0.7) and the comparison group change (-2.4). This pattern suggests that wellness program participation protects against deterioration over time that may naturally occur as part of the aging process for Medicare beneficiaries.

**Figure 4.1: Statistically Significant Outcomes for Chronic Disease Management Programs**



Notes: Includes program completers (as defined by programs) and their comparators only; DiD estimate represents the Average Treatment Effect among the Treated (ATT).

\*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

Table 4.1 includes all survey outcomes. Notably, no CDM program impact was detected for SF-36 physical health measures and medication adherence, outcomes typically targeted by these programs. Among statistically significant DiD estimates, relative differences ranged from 2.6 percent to 5.9 percent. Although there is no standard threshold for clinical significance at the group level for our outcomes, these values indicate a very modest program impact.

**Table 4.1: Outcome Means and DiD Statistics for Chronic Disease Management Programs**

CDM Measures	Baseline Participant Mean	Six Month Participant Mean	Baseline Comparison Mean	Six Month Comparison Mean	DiD	90% DiD Confidence Interval	Relative Difference
SF-36 Physical Components Summary Score	40.9	40.9	40.9	40.7	0.2	-0.4 – 0.9	0.5%

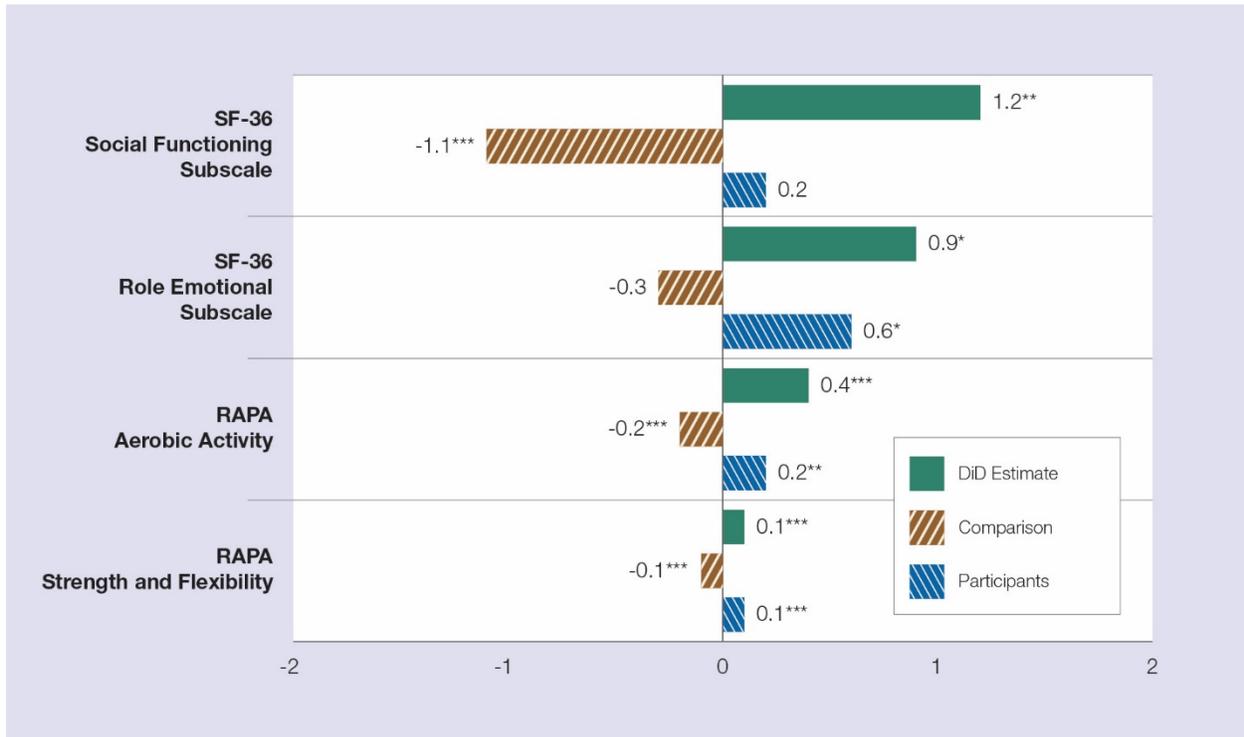
CDM Measures	Baseline Participant Mean	Six Month Participant Mean	Baseline Comparison Mean	Six Month Comparison Mean	DiD	90% DiD Confidence Interval	Relative Difference
SF-36 Physical Functioning Subscale	39.3	39.5	39.3	38.8	0.6	-0.1 – 1.4	1.5%
SF-36 Role Physical Subscale	41.4	41.8	41.3	41.0	0.6	-0.1 – 1.4	1.4%
SF-36 Bodily Pain Subscale	43.6	44.0	44.3	44.7	0.0	-0.8 – 0.8	0.0%
General Health Subscale	47.5	47.8	48.0	47.5	0.8	-0.0 – 1.5	1.7%
SF-36 Mental Components Summary Score	50.5	51.0	51.2	51.2	0.5	-0.4 – 1.4	1.0%
SF-36 Vitality Subscale	48.8	48.6	49.4	49.3	-0.0	-0.9 – 0.8	0.0%
SF-36 Social Functioning Subscale	46.6	46.4	46.5	47.0	-0.7	-1.7 – 0.3	-1.5%
SF-36 Role Emotional Subscale	43.8	44.6	44.4	44.1	1.2*	0.1 – 2.3	2.7%
SF-36 Mental Health Subscale	50.4	51.5	51.3	51.0	1.3***	0.5 – 2.1	2.6%
RAPA Aerobic Activity	4.8	4.6	4.5	4.4	-0.0	-0.3 – 0.2	0.0%
RAPA Strength and Flexibility	0.6	0.6	0.4	0.4	0.0	-0.0 – 0.1	0.0%
Any Falls in Past 6 Months	0.2	0.2	0.2	0.2	0.0	-0.0 – 0.0	0.0%
Confidence in Balance (ABC) Scale	52.5	53.2	56.6	54.2	3.1**	0.6 – 5.6	5.9%
Medication Adherence (MAQ-4)	3.0	3.1	3.0	3.2	-0.0	-0.2 – 0.1	0.0%

Notes: Includes program completers (as defined by programs) and their comparators only; the DiD estimate represents the Average Treatment Effect among the Treated (ATT); due to rounding, the DiD estimate may be slightly different from estimates calculated from the rounded means in the table. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

#### 4.1.2 Physical Activity, Nutrition, and Obesity Programs

Wellness programs focused on physical activity, nutrition, and obesity (PANO) predictably had more of an impact on physical activity as measured by the RAPA Aerobic and Strength/Flexibility scales. PANO programs also were found to positively affect two mental health measures, the SF-36 social functioning and role emotional subscales. Figure 4.2 once again illustrates improvements among participants paired with declines among comparators.

**Figure 4.2: Statistically Significant Outcomes for Physical Activity, Nutrition, and Obesity Programs**



Notes: Includes program completers (as defined by programs) and their comparators only; DiD estimate represents the Average Treatment Effect among the Treated (ATT).  
 \*p < 0.10; \*\* p < 0.05; \*\*\*p < 0.01.

Although the estimates of change for the RAPA Aerobic and Strength/Flexibility measures are small, Table 4.2 shows that they have larger relative differences for PANO programs that are approaching moderate size (7.7% and 14.3%, respectively). PANO programs are more strongly affecting their intended outcomes than CDM programs, and additionally have small benefits for mental health.

**Table 4.2: Outcome Means and DiD Statistics for Physical Activity, Nutrition, and Obesity Programs**

PANO Measures	Baseline Participant Mean	Six Month Participant Mean	Baseline Comparison Mean	Six Month Comparison Mean	DiD	90% DiD Confidence Interval	Relative Difference
SF-36 Physical Components Summary Score	46.3	46.0	45.8	45.3	0.2	-0.4 – 0.8	0.4%
SF-36 Physical Functioning Subscale	45.3	44.9	44.7	44.0	0.3	-0.4 – 1.0	0.7%
SF-36 Role Physical Subscale	46.2	46.2	45.2	44.7	0.5	-0.2 – 1.2	1.1%
SF-36 Bodily Pain Subscale	47.4	47.9	47.6	47.5	0.6	-0.3 – 1.5	1.3%
General Health Subscale	53.0	52.3	51.9	51.5	-0.2	-0.9 – 0.5	-0.4%
SF-36 Mental Components Summary Score	53.4	53.7	52.6	52.1	0.8	-0.0 – 1.6	1.5%
SF-36 Vitality Subscale	52.7	52.2	52.4	51.5	0.3	-0.3 – 1.0	0.6%
SF-36 Social Functioning Subscale	50.6	50.8	50.1	49.0	1.2**	0.4 – 2.1	2.4%
SF-36 Role Emotional Subscale	48.2	48.9	47.0	46.7	0.9*	0.1 – 1.8	1.9%
SF-36 Mental Health Subscale	53.4	53.4	52.6	52.4	0.2	-0.6 – 0.9	0.4%
RAPA Aerobic Activity	5.2	5.3	5.0	4.8	0.4***	0.2 – 0.6	7.7%
RAPA Strength and Flexibility	0.7	0.8	0.7	0.6	0.1***	0.1 – 0.2	14.3%
Any Falls in Past 6 Months	0.2	0.2	0.2	0.2	-0.0	-0.0 – 0.0	0.0%
Confidence in Balance (ABC) Scale	67.8	67.2	67.2	65.2	1.4	-0.9 – 3.7	2.1%
Medication Adherence (MAQ-4)	3.2	3.2	3.2	3.3	-0.1	-0.2 – 0.0	-3.1%

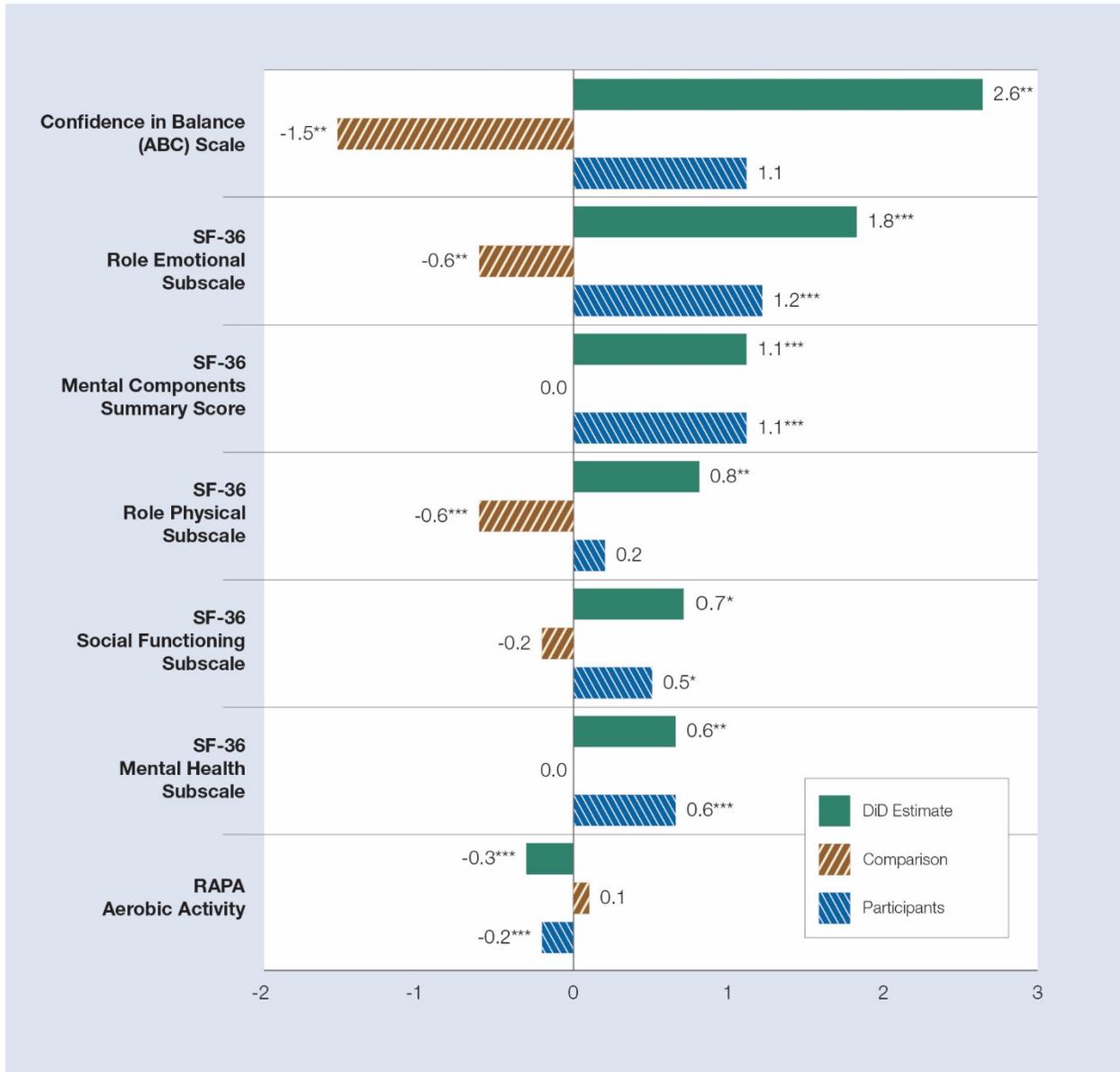
Notes: Includes program completers (as defined by programs) and their comparators only; DiD estimate represents the Average Treatment Effect among the Treated (ATT). Due to rounding, the DiD estimate may be slightly different from estimates calculated from the rounded means in this table. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

### 4.1.3 Falls Prevention Programs

Falls prevention (FP) programs had impacts on the largest number of outcomes (Figure 4.3 and Table 4.3). As expected, the programs significantly improved participants’ confidence in balance, although they did not impact the proportion of participants who reported falls during the six months following program enrollment. As with other programs, many of the positive DiD estimates result from a combination of improvement among participants and deterioration within the comparison group. Also in line with other program types, FP programs had significant

impacts on several mental health measures including the overall mental components summary score, the role emotional subscale, the mental health subscale, and the social functioning subscale.

**Figure 4.3: Statistically Significant Outcomes for Falls Prevention Programs**



Notes: Includes program completers (as defined by programs) and their comparators only; DiD estimate represents the Average Treatment Effect among the Treated (ATT).  
 \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

Interestingly, FP participants experienced a decline relative to their comparators in aerobic activity as measured by RAPA. All of the FP program impacts are relatively small, as

shown by the relative differences, with the largest differences found for the confidence in balance scale (5.1%) and the RAPA Aerobic Activity scale (-6.3%).

**Table 4.3: Outcome Means and DiD Statistics for Falls Prevention Programs**

FP Measures	Baseline Participant Mean	Six Month Participant Mean	Baseline Comparison Mean	Six Month Comparison Mean	DiD	90% DiD Confidence Interval	Relative Difference
SF-36 Physical Components Summary Score	42.3	41.6	42.8	42.2	-0.1	-0.5 – 0.3	-0.2%
SF-36 Physical Functioning Subscale	40.5	39.9	41.0	40.3	0.1	-0.3 – 0.6	0.2%
SF-36 Role Physical Subscale	42.3	42.5	42.8	42.2	0.8**	0.2 – 1.3	1.9%
SF-36 Bodily Pain Subscale	45.2	45.5	45.9	45.8	0.4	-0.2 – 0.9	0.9%
General Health Subscale	49.4	48.9	49.7	49.4	-0.2	-0.6 – 0.1	-0.4%
SF-36 Mental Components Summary Score	51.5	52.6	51.7	51.6	1.1***	0.5 – 1.7	2.1%
SF-36 Vitality Subscale	49.7	49.6	50.0	49.8	0.0	-0.4 – 0.5	0.0%
SF-36 Social Functioning Subscale	48.0	48.5	47.7	47.6	0.7*	0.0 – 1.3	1.5%
SF-36 Role Emotional Subscale	44.9	46.1	45.7	45.2	1.8***	1.1 – 2.5	4.0%
SF-36 Mental Health Subscale	51.5	52.2	51.6	51.6	0.6**	0.2 – 1.1	1.2%
RAPA Aerobic Activity	4.8	4.6	4.5	4.6	-0.3***	-0.4 – -0.2	-6.3%
RAPA Strength and Flexibility	0.6	0.6	0.5	0.5	0.0	-0.0 – 0.1	0.0%
Any Falls in Past 6 Months	0.3	0.3	0.3	0.3	0.0	-0.0 – 0.1	0.0%
Confidence in Balance (ABC) Scale	51.3	52.4	55.7	54.2	2.6**	0.9 – 4.3	5.1%
Medication Adherence (MAQ-4)	3.2	3.2	3.2	3.3	0.0	-0.0 – 0.1	0.0%

Notes: Includes program completers (as defined by programs) and their comparators only; DiD estimate represents the Average Treatment Effect among the Treated (ATT). Due to rounding, the DiD estimate may be slightly different from estimates calculated from the rounded means in this table.

\*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

## 4.2 Discussion and Conclusion

The 6-month DiD results suggest that wellness programs are improving several self-reported health outcomes and behaviors for participants. The magnitude of effects is generally small, but statistically significant effects are consistently positive with the exception of aerobic

activity levels in FP program participants. Several patterns are intuitive and in line with the focus areas and design of the programs. For example, PANO programs improved participants' self-reported physical activity levels, and FP programs improved scores on the SF-36 role physical subscale, as well as the confidence in balance measure.

The most consistently positive program impacts were on mental health, as measured by the SF-36. All three program types were associated with small, statistically significant positive effects in different areas of mental health. This is an important finding given that the intended impacts of these programs are primarily medical and physical in nature. An important secondary benefit of participation is enhanced mental well-being, which may result from both lifestyle changes and knowledge gained from programs, or from the social act of program participation.

The findings from this analysis are adjusted for bias that may result from panel attrition between the baseline and six month surveys. We focused most of this analysis on health outcomes that can best (or only) be measured through self-report, such as activity levels, psychological wellbeing, functional health, and balance confidence. It is important to acknowledge other sources of error that cannot be corrected through weighting, most notably the measurement error introduced by self-report surveys. A feature of panel surveys among matched treatment and comparison groups is that both treatment and comparison group respondents may be affected by the questions posed at baseline. In the case of comparison group respondents, the effect may be an encouragement to participate in wellness programs or make other positive lifestyle changes, which may bias difference-in-difference estimates towards zero. Given the tendency of comparison group members to decline on many outcomes, we suspect that unintended treatment effects on comparators were minimal.

## 5 ESTIMATED OPERATIONAL COSTS TO DELIVER WELLNESS PROGRAMS

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This section describes the operational costs of running a wellness program. The Acumen team collected information from 11 organizations with long-term experience delivering wellness programs and conducted an environmental scan of publically available cost reports from programs. The Acumen team sought to collect information in the following categories: labor, workforce development, supplies and equipment, and administrative and other miscellaneous costs. A detailed description of the methodology used to estimate operational costs is available in Section 2.5 Analysis of Estimated Operational Costs to Deliver Wellness Programs. Section 5.1 describes the findings and presents estimated operational costs for each wellness program. Section 5.2 discusses these results and offers some concluding thoughts.

### 5.1 Results

Across wellness programs, operational costs resulting from the current analysis and environmental scan are moderate and ranged from \$100 to \$500 per participant, excluding an outlier organization that included start-up costs. Estimated costs for each wellness program are described in turn.

#### 5.1.1 CDSMP and DSMP

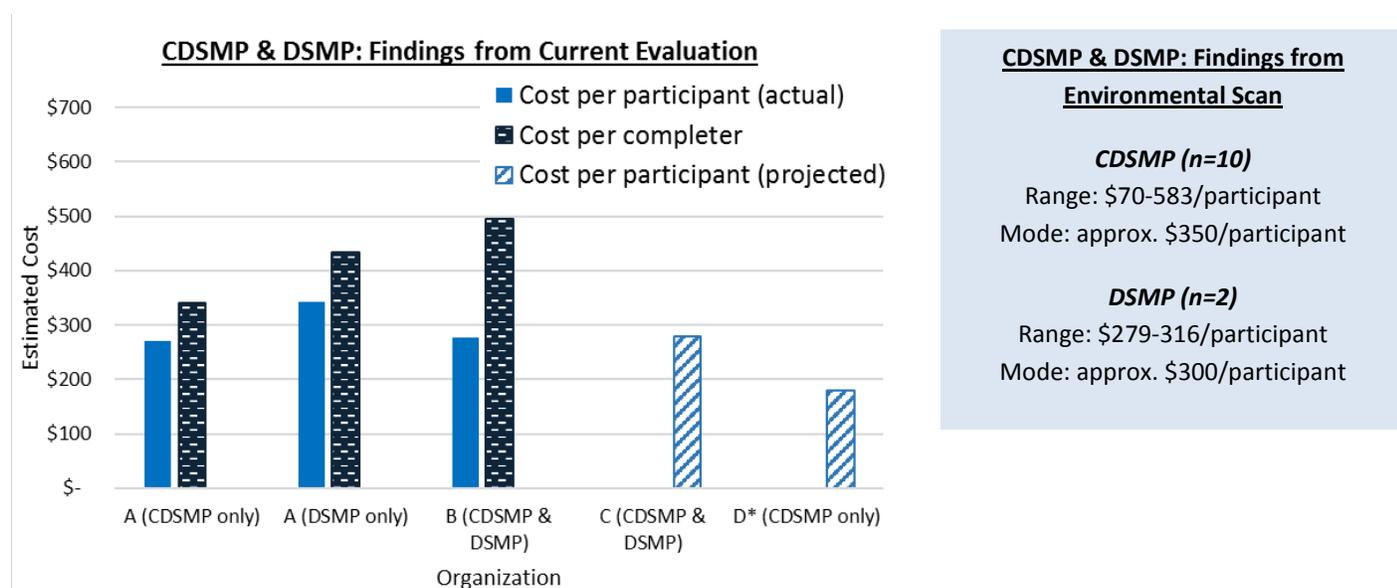
As shown in Figure 5.1, estimated program costs per participant for CDSMP and DSMP<sup>23</sup> ranged from \$179 (Organization D) to \$343 (Organization A, DSMP only), and estimated costs per completer ranged from \$341 (organization A, CDSMP only) to \$495

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<sup>23</sup> Organizations B and C reported cost information for CDSMP and DSMP combined, which was acceptable because CDSMP and DSMP are operationally similar in terms of staffing, workforce trainings, supplies and equipment and other costs.

(Organization B). This is consistent with findings from the environmental scan for both CDSMP<sup>24</sup> and DSMP.<sup>25</sup>

**Figure 5.1: CDSMP & DSMP Estimated Cost per Participant and per Completer**



**CDSMP & DSMP: Findings from Environmental Scan**

**CDSMP (n=10)**  
 Range: \$70-583/participant  
 Mode: approx. \$350/participant

**DSMP (n=2)**  
 Range: \$279-316/participant  
 Mode: approx. \$300/participant

\* Projected costs for Organization D exclude workforce training and annual licensing fees.

<sup>24</sup> Ahn, S., et al. (2013). The impact of chronic disease self-management programs: healthcare savings through a community-based intervention. *BMC Public Health*, 13, 1141.

Bovbjerg, V.E. & Kingston, M.S.J. (2010). Program Impact Report: Oregon’s Living Well with Chronic Conditions. Oregon State University College of Health and Human Services. Retrieved December 23, 2015, from <http://public.health.oregon.gov/DiseasesConditions/ChronicDisease/LivingWell/Documents/Living%20Well%20Program%20Impact%20Report%20Final.pdf>

Kulinski, K. (personal communication, December 10, 2015).

Lorig, K. R., et al. (2001). Chronic Disease Self-Management Program: 2-Year Health Status and Health Care Utilization Outcomes. *Medical Care*, 39, 1217-1223.

Lorig, K.R., et al. (2001). Effect of a self-management program on patients with chronic disease. *Effective Clinical Practice*, 4, 256-262.

Miller, N. (2014). North Carolina Evidence-Based Health Aging Programs [PDF document]. Retrieved from <https://www.regonline.com/custImages/350000/356014/2014%20Action%20Institute/NorthCarolinaEvidence-BasedHealthyAgingPrograms-May20.pdf>.

National Council on Aging. (n.d.). Program Summary: Chronic Disease Self-Management Program (CDSMP) [PDF document]. Retrieved from <http://www.op.nysed.gov/surveys/mhpsw/sofa-att8.pdf>

National Council on Aging. (2014). Chronic Disease Self-Management Education Integrated Services Delivery System Assessment Tool: Results from the 2014 Assessment. Retrieved from <https://www.ncoa.org/resources/chronic-disease-self-management-education-integrated-services-delivery-system-assessment-tool-results-2014>.

Ory, M. G., et al. (2014, July). Estimating CDSMP Health Cost Savings: A New Tool for Program Implementers [PDF document]. Presentation at the N4a Answers on Aging Annual Conference & Tradeshow, Dallas, TX. Retrieved from <http://www.n4aconference.org/2014/local/uploads/files/Estimating%20CDSMP%20Health%20Cost%20Savings%20A%20New%20Tool%20for%20Program%20Implementers%20-%20Kulinski.pdf>.

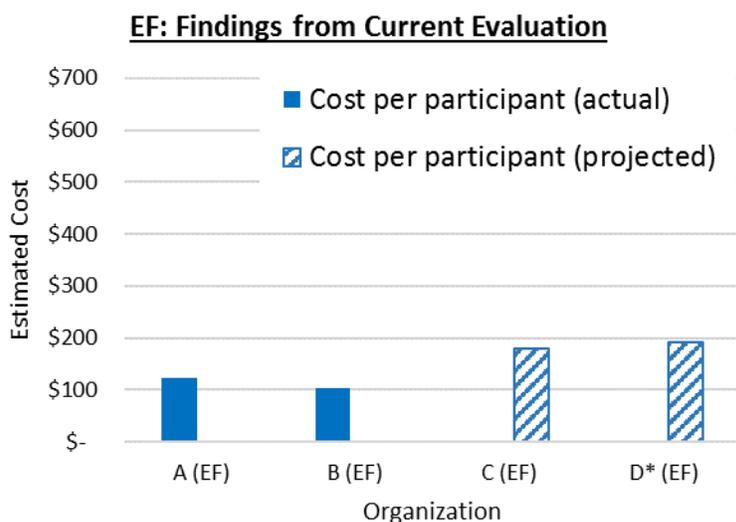
Page, T. F. & Palmer, R. C. (2014). Cost analysis of chronic disease self-management programmes being delivered in South Florida. *Health Education Journal*, 73, 228-236.

### 5.1.2 EnhanceFitness

As shown in Figure 5.2, estimated annual costs per participant for EnhanceFitness<sup>26</sup> ranged from \$103 (Organization B) to \$191 (Organization D). Publications identified during the environmental scan reported annual operational costs per class rather than per participant and, thus, were not directly comparable to the current analysis.<sup>27</sup>

When analyzing EnhanceFitness estimated costs, participant retention had an influence on an organization’s estimated costs per participant. EnhanceFitness is an ongoing wellness program that participants may attend for a few sessions or, as some organizations reported, for multiple years. Organizations that were able to retain participants for longer periods of time had higher per participant costs; however, the higher costs may be worthwhile as long-term participation may help sustain the benefits of EnhanceFitness.

**Figure 5.2: EnhanceFitness Estimated Cost per Participant**



**EF: Findings from Environmental Scan (n=3)**

- Publications identified during the environmental scan reported operational costs per class rather than per participant and, thus, were not directly comparable to the current analysis.

\* Projected costs for Organization D exclude workforce training and annual licensing fees.

<sup>25</sup> Banister, N. A., et al. (2004). Diabetes self-management training program in a community clinic improves patient outcomes at modest cost. *Journal of the American Dietetic Association*, 104, 807-810.

Prezio, E. A., et al. (2014). The Community Diabetes Education (CoDE) Program: Cost-Effectiveness and Health Outcomes. *American Journal of Preventive Medicine*, 47, 771-779.

<sup>26</sup> Actual operational costs for EnhanceFitness were collected from two organizations and projected costs from two organizations.

<sup>27</sup> National Council on Aging. (n.d.). Program Summary: EnhanceFitness [PDF document]. Retrieved from <https://www.ncoa.org/resources/program-summary-enhancefitness>

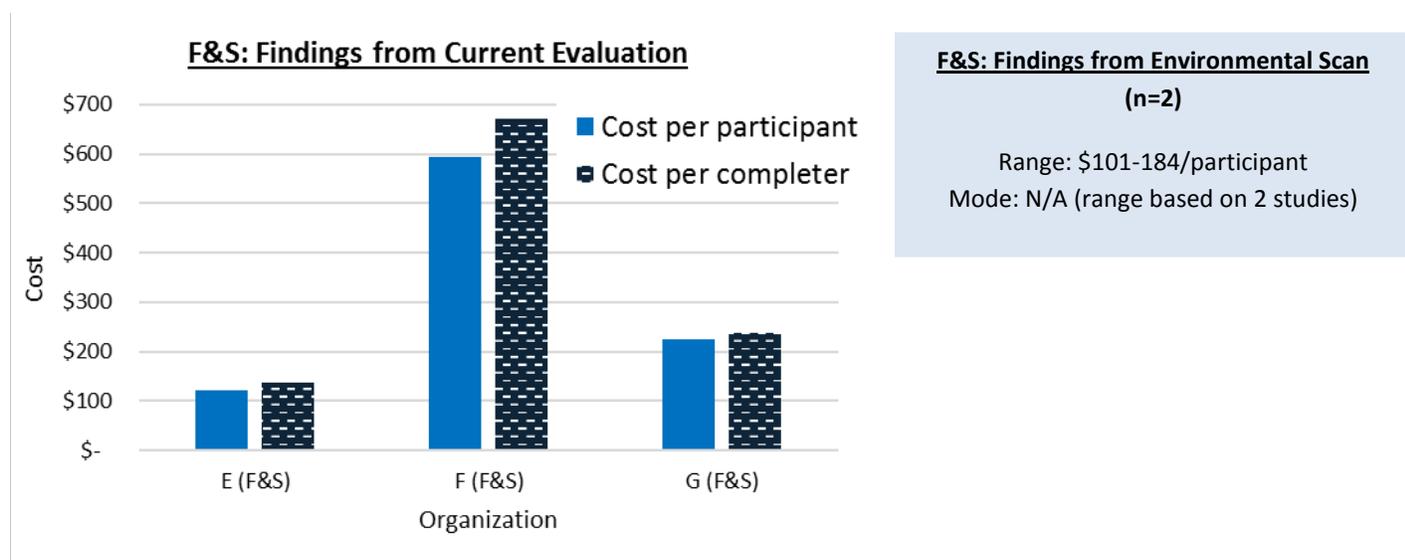
Page, T. F., et al. (2014). Implementation Cost Analysis of a Community-Based Exercise Program for Seniors in South Florida. *Health Promotion Practice*, 15, 585-591.

Sugihara, N., et al. (2011). Cost-Benefit Estimates of an Elderly Exercise Program on Kaua'i. *Hawaii Medical Journal*, 70, 116-120.

### 5.1.3 Fit & Strong!

As shown in Figure 5.3, estimated annual costs per participant for Fit & Strong!<sup>28</sup> ranged from \$122 (Organization E) to \$594 (Organization F), and estimated costs per completer ranged from \$137 (Organization E) to \$671 (Organization F). Estimated costs at Organizations E and G are roughly consistent with the environmental scan.<sup>29</sup> Organization F's costs may be an outlier because they include start-up costs such as initial staff trainings and equipment purchases.

**Figure 5.3: Fit & Strong! Estimated Cost per Participant and per Completer**



### 5.1.4 A Matter of Balance

As shown in Figure 5.4, estimated annual costs per participant for A Matter of Balance<sup>30</sup> ranged from \$198 (Organization I) to \$334 (Organization B), and estimated costs per completer ranged from \$238 (Organization I) to \$342 (Organization B). Estimated costs were consistent with the environmental scan.<sup>31</sup>

<sup>28</sup> Actual operational costs for Fit & Strong! were collected from three organizations. Organizations E and G had at least one year of experience delivering Fit & Strong, and Organization F reported annual costs from its first year of program delivery and included start-up costs.

<sup>29</sup> National Council on Aging. (n.d.). Program Summary: Fit and Strong! [PDF document]. Retrieved from <https://www.ncoa.org/resources/program-summary-fit-and-strong/>  
National Council on Aging. (2012, November 29). Evidence-based Physical Activity Programs [Webinar]. Retrieved from <https://www.ncoa.org/wp-content/uploads/Grantee-Webinar-11-29-2012.pdf>.

<sup>30</sup> Actual operational costs for A Matter of Balance were collected from three organizations.

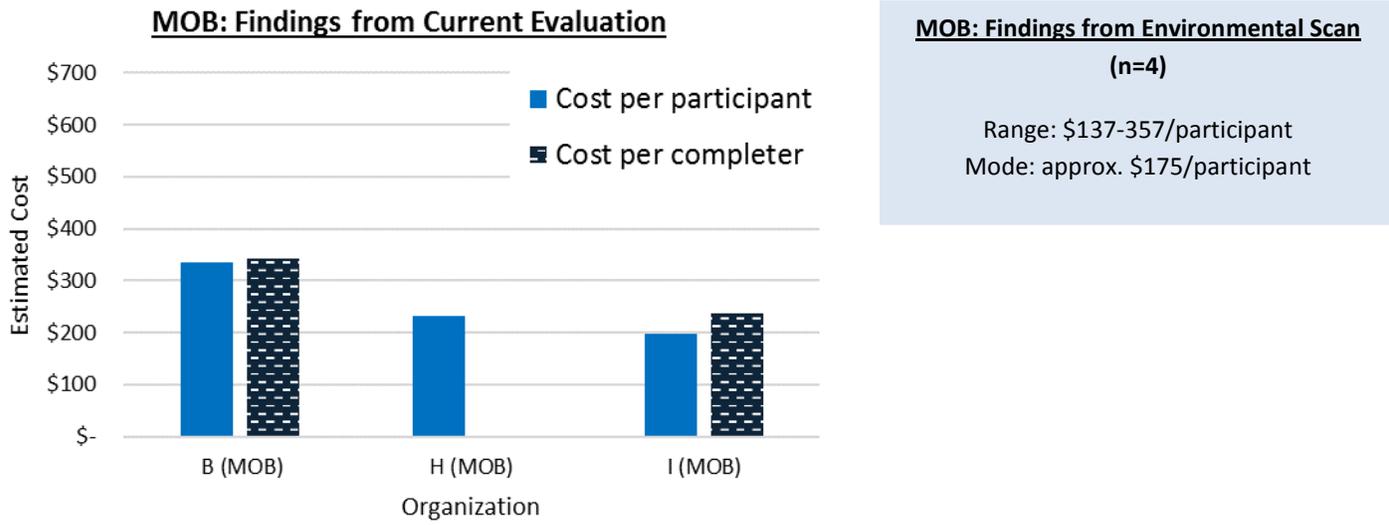
<sup>31</sup> Howland, J., et al. (2015). Savings in acute care costs if all older adults treated for fall-related injuries completed matter of balance. *Injury Epidemiology*, 2, 25.

Miller, T. R., et al. (2011). Assessing Costs and Potential Returns of Evidence-Based Programs for Seniors. *Evaluation & the Health Professions*, 34, 201-225.

Miller, N. (2014). North Carolina Evidence-Based Healthy Aging Programs [PDF document].

Page, T. F., Batra, A., & Palmer, R. (2012). Cost Analysis of a Community-Based Fall Prevention Program Being Delivered in South Florida. *Family & Community Health*, 35.

**Figure 5.4 A Matter of Balance Estimated Cost per Participant and per Completer**



### 5.1.5 Stepping On

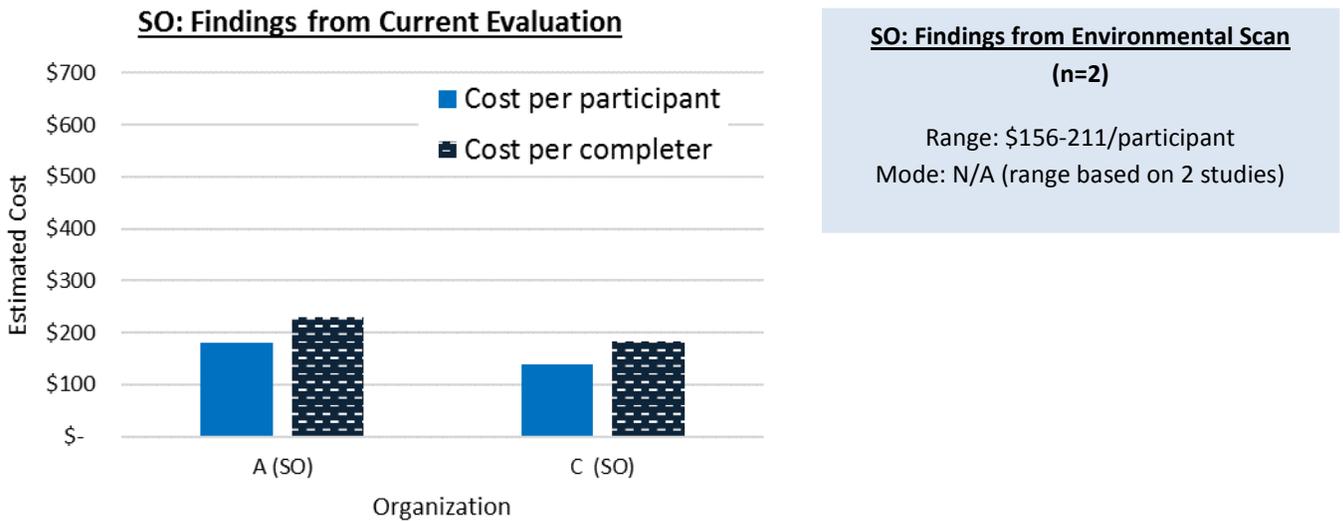
As shown in Figure 5.5, estimated annual costs per participant for Stepping On<sup>32</sup> ranged from \$138 (Organization C) to \$182 (Organization A), and estimated costs per completer ranged from \$183 (Organization C) to \$231 (Organization A). Estimated costs were consistent with the environmental scan.<sup>33</sup>

<sup>32</sup> Actual operational costs for Stepping On were collected from two organizations.

<sup>33</sup> Carande-Kulis, V. G., et al. (2010). The business case for interventions to prevent fall injuries in older adults. *Injury Prevention*, 16, A249.

Carande-Kulis, V. G., et al. (2015). A cost-benefit analysis of three older adult fall prevention interventions. *Journal of Safety Research*, 52, 65-70.

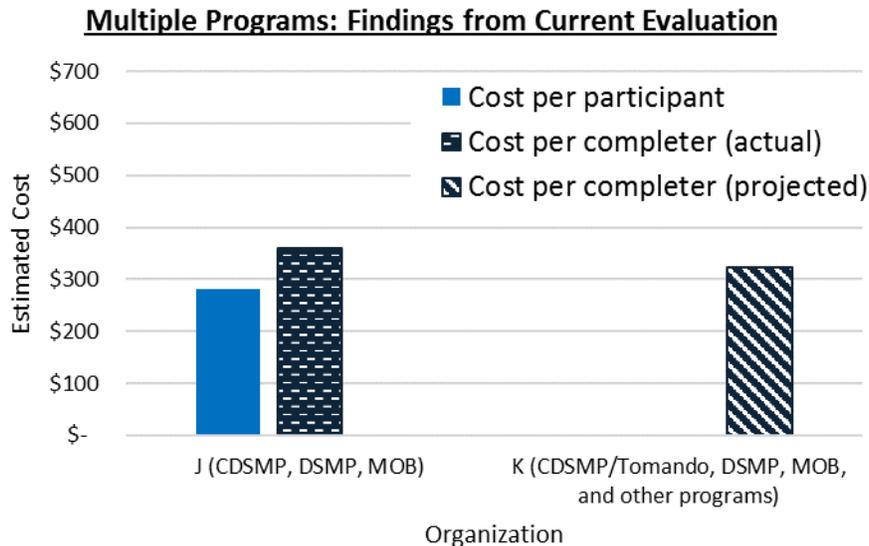
**Figure 5.5: Stepping On Estimated Cost per Participant and per Completer**



**5.1.6 Multiple Wellness Programs or ACA Priority Areas**

Two organizations<sup>34</sup> provided estimated operational costs or projections that comingled data across wellness programs and ACA priority areas. Summary costs across multiple wellness programs were approximately \$275 to 375 per person (Figure 5.6).

**Figure 5.6: Estimated Cost per Participant and per Completer at Organizations Reporting Costs for Multiple Wellness Programs or ACA Priority Areas**



<sup>34</sup> Organization K provided annual projected costs for all wellness program operations. The vast majority of wellness programs offered by Organization K were programs included in the Prospective Evaluation, but some wellness programs were not.

## 5.2 Discussion and Conclusions

Across wellness programs, operational costs resulting from the current analysis and environmental scan ranged from \$100 to \$500 per participant, excluding an outlier organization that included start-up costs. All organizations in the current analysis were large, well-established implementers and had staffing models that included multiple managers, program staff, and volunteers. Some organizations were statewide coordinators or a Center of Excellence for selected wellness programs. Large organizations play an important role in the scalability of wellness programs because they may offer efficiencies (e.g., centralized leadership training) and may support high-quality program delivery and fidelity in their regions. However, large organizations represent only a small subset of organizations that deliver wellness programs. Many organizations that deliver wellness programs do so with a limited number of staff (i.e., 1-3 staff members) and resources.

Operational costs reported in this analysis may be lower than is needed to sustain wellness program delivery. For example, CDSMP, DSMP, MOB, and Stepping On rely on volunteers to serve as leaders of the wellness program workshops. As reported in the Qualitative Study of Program Operations<sup>7</sup>, such wellness programs recruit leaders from the local communities, which helps keep costs low. However, as noted in that study, reliance on volunteers can threaten the sustainability of the programs because unpaid leaders are more likely to resign. Implementers suggested that a potential approach to making wellness programs more sustainable and scalable nationwide may be to financially compensate workshop leaders. For this reason, EnhanceFitness and Fit & Strong! currently recommend that implementers employ certified fitness instructors as program leaders and provide hourly compensation.

## 6 NEXT STEPS

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Future reports will include results of the impact of participation in wellness programs on these same self-reported health outcomes and behaviors at 12 months and will address program impacts on other health outcomes, service utilization, and cost. In addition, the team will conduct a global assessment of program impacts and operations based on the combined quantitative and qualitative findings of specific program effects on health status, behavior, resource use, demand in the Medicare population for wellness programs, and program operational costs. The intent of this global assessment is to provide additional insights into the viability and benefits of wellness programs and to inform and support federal efforts to offer additional wellness and preventive services.

## APPENDIX A– DESCRIPTIONS OF WELLNESS PROGRAMS PARTICIPATING IN THE EVALUATION

This section summarizes the target population, programmatic goals, history, and implementation recommendations for the six wellness programs in the evaluation in Appendix Table A.1. Additional detail about the wellness programs is available in the “Wellness Prospective Evaluation Report on Baseline Survey Efforts and Qualitative Study of Program Operations and Costs.”<sup>7</sup>

**Appendix Table A.1: Wellness Program Characteristics**

Program Characteristics	CDSMP	DSMP	EF	F&S	MOB	SO
<b>ACA priority area</b>						
Chronic disease management	•	•		•		
Physical activity, nutrition and obesity	•	•	•	•		
Mental health	•	•				
Falls prevention					•	•
<b>Target populations</b>						
Medicare	•	•	•	•	•	•
Non-Medicare	•	•	•	•	•	•
Community dwelling	•	•	•	•	•	•
Diabetes		•				
Spanish language adaptation available	•	•	•	•	•	•
<b>Program goals</b>						
Improve physical health/ fitness	•	•	•	•		
Increase clinical disease management	•	•		•		
Increase independent/ daily living skills	•	•	•	•		•
Increase activity level		•	•		•	
Improve communication with physicians	•					
Provide information and skills to avoid falls					•	•
Reduce emergency room visits/ healthcare costs		•				
<b>History</b>						
Year started (in current form)	1990	2008	1997	1996	2003	2004
<b>Geographic reach</b>						
Number of states, incl. Washington DC & Puerto Rico	≥40	≥40	30-40	<10	30-40	10-20
International	•	•			•	•
<b>Program administration</b>						
Community/ classroom based	•	•	•	•	•	•
Home visits						•
Number of sessions (total)	6	6	NA	24	8	7
Number of sessions (to be considered completion)	4	4	11	18	5	5
<b>Instructors</b>						
Number of instructors	2	2	1	1	1	2
Instructors include someone from target population	•	•				•
Paid instructors	Stipend optional	Stipend optional	Not specified	•		Not Specified

## APPENDIX B– ORGANIZATIONS INVOLVED IN BASELINE PARTICIPANT SURVEY DATA COLLECTION

This appendix summarizes Acumen’s baseline participant survey data collection partners. Organizations presented in Appendix Table B.1 collaborated with Acumen on data collection for the baseline survey of wellness program participants and provided attendance records.

**Appendix Table B.1: Baseline Participant Survey Data Collection Partners**

Organization	Location	CDSMP	DSMP	EF	F&S	MOB	SO
Alliance for Aging	Miami, FL	•	•			•	•
Alliance Rehab	Warrenville, IL				•		
Anne Arundel County Department on Aging and Disabilities	Annapolis, MD		•				
Area Agency on Aging 3	Lima, OH		•				
Ark-Tex Council of Governments Area Agency on Aging	Texarkana, TX				•		
Arthritis Services	Charlotte, NC				•		
Baltimore County Department of Aging	Towson, MD	•					•
Bluegrass Area Agency on Aging and Independent Living	Lexington, KY		•				
C.W. Avery Family YMCA	Plainfield, IL			•			
Care Connection for Aging Services	Warrensburg, MO	•	•			•	
Centralina Area Agency on Aging	Charlotte, NC	•	•			•	
Deschutes County Health Department	Bend, OR	•	•				
Detroit Area Agency on Aging	Detroit, MI			•			
Dignity Health - St. Rose Dominican Green Valley Center	Henderson, NV		•		•		
Elder Options- Mid Florida Area Agency on Aging Division of Community Outreach and Healthy Aging	Gainesville, FL		•				
Empowerment Systems / Arizona Living Well Institute	Apache Junction, AZ	•	•				
Evi-Base LLC	Independence, OH	•	•				
Fairfax County AAA	Fairfax, VA	•					
Fanwood-Scotch Plains YMCA	Scotch Plains, NJ			•			
Greater Wichita YMCA	Wichita, KS			•			
Health for Life Consulting	Holt, MI	•	•	•		•	
KIPDA Area Agency on Aging and Independent Living/Aging and Disability Resource Center	Louisville, KY	•				•	
Lifespan of Greater Rochester, Inc.	Rochester, NY					•	
MAC Inc.	Salisbury, MD	•	•	•			•
Madison-Mayodan Senior Center	Mayodan, NC				•		
Maui County Office on Aging	Wailuku, HI	•		•			
Medical Mall Services, LLC / Prince George's County AAA	Largo, MD		•				
Mercer County Family YMCA	Aledo, IL			•			
Mercy Hospital - Springfield	Springfield, MO	•	•				
Middle Georgia Regional Commission Area Agency on Aging	Macon, GA	•	•			•	
National Kidney Foundation of Michigan	Ann Arbor, MI	•	•	•			

Organization	Location	CDSMP	DSMP	EF	F&S	MOB	SO
New Lenox Police Department	New Lenox, IL				•	•	
New Mexico Senior Olympics	Roswell, NM			•			
Norm Waitt Sr. YMCA	South Sioux City, NE			•			
North Shore/Long Island Jewish Health System	Lake Success, NY						•
Northern Arizona Council of Governments Area Agency on Aging	Flagstaff, AZ					•	
Northwest Indiana Community Action	Crown Point, IN		•			•	
Pima Council on Aging	Tucson, AZ			•		•	
Poudre Valley Health System Foundation	Ft. Collins, CO		•				
Resources for Seniors	Raleigh, NC				•		
Salt Lake County Aging and Adult Services	East Salt Lake City, UT	•	•	•			•
Sanford Center, University of Nevada	Reno, NV		•		•		
Senior Citizen Services of Tarrant County	Fort Worth, TX	•	•			•	
Senior Connection Center	Tampa, FL	•				•	
Senior Resources of Guilford - GSO Office	Greensboro, NC				•		
Senior Services Associates Inc.	Crystal Lake, IL				•		
Senior Services of Seattle	Seattle, WA	•		•		•	
Senior Services of Southeastern Virginia	Norfolk, VA	•	•			•	
Sewickley Valley YMCA	Sewickley, PA			•			
Southern Illinois Hospital Services	Carbondale, IL		•				
Southern Maine Area Agency on Aging	Scarborough, ME					•	
St. Anthony Hospital/Centura Health	Lakewood, CO						•
State of Delaware Division of Public Health	Dover, DE		•				
The Commons of Evergreen	Holland, MI			•	•		
Total Life Center	Oklahoma City, OK		•				
Treasure Valley Family YMCA	Boise, ID			•			
University of Nebraska Medical Center EngAge Wellness	Omaha, NE				•		
Utah County Health Department	Provo, UT						•
Utah Department of Health	Salt Lake City, UT						•
Valley Program for Aging Services	Waynesboro, VA	•	•				
Volusia Flagler Family YMCA	Deland, FL			•			
Washington County Health Department	Hagerstown, MD		•				•
Washington Seniors Wellness Center	Washington, DC			•			
West Virginia School of Osteopathic Medicine	Lewisburg, WV		•				
Western Illinois Area Agency on Aging	Rock Island, IL					•	
White Crane Wellness Center	Chicago, IL				•		
Wisconsin Institute for Healthy Aging	Madison, WI						•
YMCA of Greater Cincinnati	Cincinnati, OH			•			
YMCA of Greater San Antonio	San Antonio, TX			•			
YMCA of Lenawee County	Adrian, MI			•			
YMCA of Lincoln Nebraska	Lincoln, NE			•			
YMCA of Marquette County	Marquette, MI			•			
YMCA of Metropolitan Washington	Washington, DC			•			
YMCA of Southern Arizona	Tucson, AZ			•			
YMCA of Western North Carolina	Asheville, NC			•			

## **APPENDIX C – SURVEY INSTRUMENTS**

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Appendix C contains four survey instruments:

- Baseline National Survey
- Baseline Participant Survey
- Six-Month National Survey
- Six-Month Participant Survey

## C.1 Baseline National Survey

### Start Here

- ▶ Please use a black or blue pen to complete this form.
- ▶ Mark  to indicate your answer. If you want to change your answer, darken the box  and mark the correct answer.

### Your Health

These first questions are about your health. Please mark one answer only. If you are unsure about how to answer a question, please give the best answer you can.

#### 1. In general, would you say your health is

- Excellent
- Very good
- Good
- Fair
- Poor

#### 2. Compared to one year ago, how would you rate your health in general now?

- Much better than one year ago
- Somewhat better now than one year ago
- About the same as one year ago
- Somewhat worse now than one year ago
- Much worse now than one year ago

#### 3. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

##### a. Vigorous activities, such as running, lifting heavy objects, or participating in strenuous sports

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### c. Lifting or carrying groceries

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### d. Climbing several flights of stairs

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### e. Climbing one flight of stairs

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### f. Bending, kneeling, or stooping

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### g. Walking more than a mile

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### h. Walking several hundred yards

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all



**i. Walking one hundred yards**

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

**j. Bathing or dressing yourself**

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

**4. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?**

**a. Cut down on the amount of time you spent on work or other activities**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**b. Accomplished less than you would like**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**c. Were limited in the kind of work or other activities**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**d. Had difficulty performing the work or other activities (for example, it took extra effort)**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**5. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?**

**a. Cut down on the amount of time you spent on work or other activities**

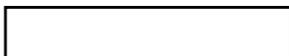
- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**b. Accomplished less than you would like**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**c. Did work or activities less carefully than usual**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time



6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

- Not at all
- Slightly
- Moderately
- Quite a bit
- Extremely

7. How much bodily pain have you had during the past 4 weeks?

- None
- Very mild
- Mild
- Moderate
- Severe
- Very severe

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

- Not at all
- A little bit
- Moderately
- Quite a bit
- Extremely

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the past 4 weeks...

a. Did you feel full of life?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

b. Have you been very nervous?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

c. Have you felt so down in the dumps that nothing could cheer you up?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

d. Have you felt calm and peaceful?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time



**e. Did you have a lot of energy?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**f. Have you felt downhearted and depressed?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**g. Did you feel worn out?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**h. Have you been happy?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**i. Did you feel tired?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**11. How TRUE or FALSE is each of the following statements for you?**

**a. I seem to get sick a little easier than other people**

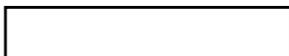
- Definitely true
- Mostly true
- Don't know
- Mostly false
- Definitely false

**b. I am as healthy as anybody I know**

- Definitely true
- Mostly true
- Don't know
- Mostly false
- Definitely false

**c. I expect my health to get worse**

- Definitely true
- Mostly true
- Don't know
- Mostly false
- Definitely false



**d. My health is excellent**

- Definitely true
- Mostly true
- Don't know
- Mostly false
- Definitely false

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**12. Which statement best describes your vision (with glasses or contact lenses if you wear them)?**

- I have no trouble seeing
- I have a little trouble seeing
- I have a lot of trouble seeing
- I am blind

**13. Which statement best describes your hearing (with a hearing aid if you use one)?**

- I have no trouble hearing
- I have a little trouble hearing
- I have a lot of trouble hearing
- I am deaf

**14. How tall are you?**

feet     inches

**15. How much do you weigh?**

pounds

**16. Has a doctor ever told you that you have arthritis?**

- Yes
- No

**17. Other than during pregnancy, has a doctor EVER told you that you have diabetes or sugar diabetes?**

- Yes
- No

**18. Other than during pregnancy, has a doctor EVER told you that you have pre-diabetes or borderline diabetes?**

- Yes
- No

**19. Have you ever smoked cigarettes, cigars, or pipe tobacco?**

- Yes
- No

**20. Do you smoke cigarettes, cigars, or pipe tobacco now?**

- Yes
- No

**21. Have you had a flu shot in the past year?**

- Yes
- No



### **Making Changes to Stay Healthy**

The next questions are about changes you might make to improve your health or reduce the chances of getting sick.

**22. Some people change their diet to include more healthy foods like fruits, vegetables, and whole grains. Which of the following statements best describes your thoughts about making this kind of change?**

- I don't need to make a change like this
- I am currently trying to make this kind of change, or made it recently
- I am thinking about making this kind of change in the next month or sooner
- I am thinking about making this kind of change, but not in the next month
- I am not thinking of making a change like this

**23. Some people change their diet or increase the amount of exercise they get to help manage their weight. Which of the following statements best describes your thoughts about making this kind of change to help manage your weight?**

- I don't need to make a change like this
- I am currently trying to make this kind of change, or made it recently
- I am thinking about making this kind of change in the next month or sooner
- I am thinking about making this kind of change, but not in the next month
- I am not thinking of making a change like this

**24. Some people start new exercise programs or increase the amount they exercise as a way of staying healthy. Which of the following statements best describes your thoughts about making this kind of change?**

- I don't need to make a change like this
- I am currently trying to make this kind of change, or made it recently
- I am thinking about making this kind of change in the next month or sooner
- I am thinking about making this kind of change, but not in the next month
- I am not thinking of making a change like this

**25. Some people start exercise programs to help them improve their balance or prevent falls. Which of the following statements best describes your thoughts about making this kind of change?**

- I don't need to make a change like this
- I am currently trying to make this kind of change, or made it recently
- I am thinking about making this kind of change in the next month or sooner
- I am thinking about making this kind of change, but not in the next month
- I am not thinking of making a change like this



**26. Some people make changes to better manage arthritis, diabetes, high blood pressure, or other health problems. Which of the following statements best describes your thoughts about making this kind of change?**

- I don't need to make a change like this
- I am currently trying to make this kind of change, or made it recently
- I am thinking about making this kind of change in the next month or sooner
- I am thinking about making this kind of change, but not in the next month
- I am not thinking of making a change like this

***The next question is about actions your health care provider may have suggested that you take to improve your health.***

**27. In the past 12 months, has a doctor, nurse, or other health care provider suggested you do any of the following?**  
*Please mark all that apply.*

- I have not visited a doctor or other health care professional in the past 12 months → **GO TO 28**
- Eat more healthful foods, such as fruits, vegetables, and whole grains
- Lose or gain weight
- Get regular exercise appropriate for your ability
- Improve your balance, such as to help prevent falls
- Manage health problems like arthritis, diabetes, high blood pressure
- None of these

***The next few questions are about your awareness of and enrollment in wellness programs to help you make a change based on your need.***

***Wellness programs*** are ongoing, organized group meetings or sessions, done online or in person, where the focus is on improving one's health through knowledge and/or activity. (Do not include diet or fitness programs done on an individual basis.)

**28. Do you know of any wellness programs in your community or online to help people like you make these kinds of changes?**

*Please mark all that apply.*

- Yes, in my community
- Yes, online
- No

**29. [If you knew of a wellness program in your community to help people like you to make this kind of change,] How likely is it that you would sign up in the next 6 months?**

- Very likely
- Likely
- Somewhat likely
- Not at all likely



**30. If you were to sign up for this kind of wellness program, which kind of program would you be likely to sign up for?**

*Please mark all that apply.*

- Eating healthful foods, such as fruits, vegetables, and whole grains
- Managing your weight
- Get regular exercise appropriate for your ability
- Improving your balance and preventing falls
- Manage health problems like arthritis, diabetes, high blood pressure, or other conditions
- None of these
- Other

**31. If Medicare covered this kind of wellness program, how likely is it that you would sign up in the next 6 months?**

- Very likely
- Likely
- Somewhat likely
- Not at all likely

**32. Have you participated in a wellness program in your community or online to help you make this kind of change in the past 24 months?**

- Yes → GO TO 33
- No → SKIP TO 34

**33. Have you participated in any program in the past 24 months, either in your community or online, to address any of the following goals?**

*Please mark all that apply.*

- Eating healthful foods, such as fruits, vegetables, and whole grains
- Managing your weight
- Get regular exercise appropriate for your ability
- Improving your balance and preventing falls
- Manage health problems like arthritis, diabetes, high blood pressure, or other conditions
- None
- Other, specify:

### **Making Health Care Decisions**

The next questions are about making health care decisions. Your answers will help Medicare better understand how people use medical services. Please keep in mind that there are no right or wrong answers to these questions. Your opinions and experiences are important to us.

**34. How confident are you that you can identify when it is necessary for you to get medical care?**

- Very confident
- Confident
- Somewhat confident
- Not at all confident



- 35. Do you always, usually, sometimes, or never take a list of all your prescribed medicines to your doctor visits?**
- Always
  - Usually
  - Sometimes
  - Never
  - I don't take any prescribed medications

**Your Beliefs**

For each of the following statements, please mark the one response which fits you best:

- 36. I will be able to achieve most of the goals that I have set for myself.**
- Strongly agree
  - Agree
  - Neutral
  - Disagree
  - Strongly disagree
- 37. When facing difficult tasks, I am certain that I will accomplish them.**
- Strongly agree
  - Agree
  - Neutral
  - Disagree
  - Strongly disagree
- 38. In general, I think that I can obtain outcomes that are important to me.**
- Strongly agree
  - Agree
  - Neutral
  - Disagree
  - Strongly disagree

- 39. I believe I can succeed at almost anything that I set my mind to.**

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

- 40. I will be able to successfully overcome many challenges.**

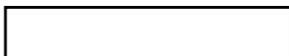
- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

- 41. I am confident that I can perform effectively on many different tasks.**

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

- 42. Compared to other people, I can do most tasks very well.**

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree



**43. Even when things are tough, I can perform quite well.**

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

**How You've Been Feeling Lately**

The next two questions are about how you have been feeling lately.

**44. Over the last 2 weeks, how often have you been bothered by any of the following:**

- a. Little interest or pleasure in doing things?**
  - Not at all
  - Several days
  - More than half the days
  - Nearly every day
- b. Feeling down, depressed, or hopeless?**
  - Not at all
  - Several days
  - More than half the days
  - Nearly every day

**Physical Activity**

Physical activities are activities where you move and increase your heart rate above its resting rate, whether you do them for pleasure, work, or transportation. The following questions ask about the amount and intensity of physical activity you usually do. The intensity of the activity is related to the amount of energy you use to do these activities.

**Examples of physical intensity levels:**

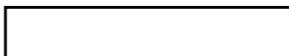
Intensity Level	Examples
<b>Light activities:</b> Your heart beats slightly faster than normal. You can talk and sing.	Walking leisurely, stretching, or light yard work
<b>Moderate activities:</b> Your heart beats faster than normal. You can talk but not sing.	Fast walking, aerobics class, strength training, swimming gently
<b>Vigorous activities:</b> Your heart rate increases a lot. You can't talk or your talking is broken up by large breaths.	Stair machine, jogging or running, tennis, racquetball, or badminton

**45. How physically active are you?**

*Please mark one answer for each question.*

**a. I rarely or never do any physical activities.**

- Yes
- No



b. I do some light or moderate physical activities, but not every week.

- Yes  
 No

c. I do some light physical activity every week.

- Yes  
 No

d. I do moderate physical activities every week, but less than 30 minutes a day or 5 days a week.

- Yes  
 No

e. I do vigorous physical activities every week, but less than 20 minutes a day or 3 days a week.

- Yes  
 No

f. I do 30 minutes or more a day of moderate physical activities, 5 or more days a week.

- Yes  
 No

g. I do 20 minutes or more a day of vigorous physical activities, 3 or more days a week.

- Yes  
 No

h. I do activities to increase muscle strength, such as lifting weights or calisthenics, once a week or more.

- Yes  
 No

i. I do activities to improve flexibility, such as stretching or yoga, once a week or more.

- Yes  
 No

### Fall and Balance

46a. A fall is when your body goes to the ground without being pushed. Did you fall in the past 6 months?

- Yes →   times  
 No → SKIP TO 47

46b. How many of these falls caused you to limit your regular activities for at least a day or to see a doctor?

- Falls limiting activity or requiring medical attention

47. In the past 6 months, have you had a problem with balance or walking?

- Yes  
 No  
 Limited to a bed or wheelchair  
↳ SKIP TO 51



48. Has your doctor or other health care provider done anything to help prevent falls or treat problems with balance or walking? Some things they might do include:

- Suggest that you use a cane or walker
- Check your blood pressure lying or standing
- Suggest that you do an exercise or physical therapy program
- Suggest a vision or hearing test

- Yes  
 No

49. Are you afraid of falling?

- Yes  
 No

**Your Confidence in Balance**

The next questions are about keeping your balance in different situations. You may have to imagine yourself in these situations if you have not encountered them recently. For each one, choose any number between 0 (no confidence) and 100 (complete confidence) to say how confident you are that you could keep your balance. If you normally use a cane or walker or hold on to someone, answer as if you had that help.

0	10	20	30	40	50	60	70	80	90	100
No										Complete
Confidence										Confidence

50. How confident are you that you can maintain your balance and remain steady when you...

a. Stand on your tiptoes and reach for something above your head?

b. Stand on a chair and reach for something?

c. Are bumped into by people as you walk through the mall?

d. Step onto or off of an escalator while holding onto a railing?

e. Step onto or off of an escalator while holding a package so you cannot hold onto the railing?

f. Walk outside on icy sidewalks?



## Medicines

The next few questions are about medicines.

**51. Do you ever forget to take your medicine?**

- I don't take any medicines → **SKIP TO 55**
- Yes
- No

**52. Do you ever have problems remembering to take your medicine?**

- Yes
- No

**53. When you feel better, do you sometimes stop taking your medicine?**

- Yes
- No

**54. Sometimes if you feel worse when you take your medicine, do you stop taking it?**

- Yes
- No

## Getting Help From Others

**55. People sometimes look to others for companionship, assistance, or other types of support. How often is each of the following kinds of support available to you if you need it?**

**a. Someone to help you if you were confined to bed?**

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All of the time

**b. Someone to take you to the doctor if you needed it?**

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All of the time

**c. Someone to prepare your meals if you were unable to do it yourself?**

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All of the time

**d. Someone to help with daily chores if you were sick?**

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All of the time

## Demographics

**56. What is your sex?**

- Male
- Female

*The next two questions are about Hispanic origin and race.*

**57. Are you of Hispanic, Latino, or Spanish origin?**

- Yes
- No



**58. What is your race?**

*Please mark all that apply.*

- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or other Pacific Islander
- White

**59. When were you born? Please provide your date of birth in month/day/year.**

		/			/	1	9		
--	--	---	--	--	---	---	---	--	--

month      day      year

**60. How well do you speak English?**

- Very well
- Well
- Not well
- Not at all

**61. What is your current marital status?**

- Married
- Living as married
- Divorced
- Separated
- Widowed
- Never married

**62. What is the highest grade or level of school that you have completed?**

- 8th grade or less
- Some high school, but did not graduate
- High school graduate or GED
- Some college or 2 year degree
- 4 year college graduate
- More than a 4 year college degree

**63. Where do you live?**

- House, apartment, condominium, mobile home
- Assisted living apartment or board care home → **SKIP TO 65**
- Other

**64. Do you live alone or with others?**

*Please mark all that apply.*

- Alone
- With spouse/significant other
- With adult children
- With other relatives
- With non-relatives

**65. What is your current employment status?**

- Employed at a job for pay, full-time
- Employed at a job for pay, part-time
- Homemaker, not currently working for pay
- Not currently employed, retired
- Not currently employed, not retired

**66. What type of health insurance do you currently have?**

*Please mark all that apply.*

- Medicare
- Medicaid (provided by state governments for low income individuals)
- A Medicare Supplemental plan
- A Medicare Advantage plan
- VA or Tricare
- Private health insurance (such as through an employer)
- Other
- None

--



67. Do you currently provide care for someone else in your home?

- Yes → GO TO 68
- No → SKIP TO 69

68. During the past week, how many days did you provide at least some care?

- No care provided in the last week
- 1 or 2 days
- 3 or 4 days
- 5 or 6 days
- 7 days (every day)

69. Do you have difficulty getting to places you need to go?

- No, I can drive, get a ride, take public transportation, or walk
- Yes, always or almost always
- Yes, sometimes

70. Who completed this survey form?

- Person to whom survey was addressed
- Family member or relative of person to whom the survey was addressed
- Friend of person to whom the survey was addressed
- Professional caregiver of person to whom the survey was addressed

71. Which of the following categories best represents the combined income for all family members in your household for the past 12 months?

- \$11,670 or less
- \$11,671–\$15,730
- \$15,731–\$19,999
- \$20,000–\$29,999
- \$30,000–\$39,999
- \$40,000–\$49,999
- \$50,000–\$79,999
- \$80,000–\$99,999
- \$100,000 or more
- Don't know

72. Date of completing this survey:

		/			/	2	0		
month			day			year			

**Thank you for your time. Please mail the survey using the prepaid addressed envelope enclosed.**

## C.2 Baseline Participant Survey

### Start Here

- ▶ Please use a black or blue pen to complete this form.
- ▶ Mark  to indicate your answer. If you want to change your answer, darken the box  and mark the correct answer.

### Your Health

These first questions are about your health. Please mark one answer only. If you are unsure about how to answer a question, please give the best answer you can.

#### 1. In general, would you say your health is

- Excellent
- Very good
- Good
- Fair
- Poor

#### 2. Compared to one year ago, how would you rate your health in general now?

- Much better than one year ago
- Somewhat better now than one year ago
- About the same as one year ago
- Somewhat worse now than one year ago
- Much worse now than one year ago

#### 3. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

##### a. Vigorous activities, such as running, lifting heavy objects, or participating in strenuous sports

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### c. Lifting or carrying groceries

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### d. Climbing several flights of stairs

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### e. Climbing one flight of stairs

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### f. Bending, kneeling, or stooping

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### g. Walking more than a mile

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### h. Walking several hundred yards

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### i. Walking one hundred yards

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all



**j. Bathing or dressing yourself**

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

**4. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?**

**a. Cut down on the amount of time you spent on work or other activities**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**b. Accomplished less than you would like**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**c. Were limited in the kind of work or other activities**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**d. Had difficulty performing the work or other activities (for example, it took extra effort)**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**5. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?**

**a. Cut down on the amount of time you spent on work or other activities**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**b. Accomplished less than you would like**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**c. Did work or activities less carefully than usual**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?**

- Not at all
- Slightly
- Moderately
- Quite a bit
- Extremely



7. How much bodily pain have you had during the past 4 weeks?

- None
- Very mild
- Mild
- Moderate
- Severe
- Very severe

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

- Not at all
- A little bit
- Moderately
- Quite a bit
- Extremely

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the past 4 weeks...

a. Did you feel full of life?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

b. Have you been very nervous?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

c. Have you felt so down in the dumps that nothing could cheer you up?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

d. Have you felt calm and peaceful?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

e. Did you have a lot of energy?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

f. Have you felt downhearted and depressed?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

g. Did you feel worn out?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

h. Have you been happy?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time



**i. Did you feel tired?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**11. How TRUE or FALSE is each of the following statements for you?**

**a. I seem to get sick a little easier than other people**

- Definitely true
- Mostly true
- Don't know
- Mostly false
- Definitely false

**b. I am as healthy as anybody I know**

- Definitely true
- Mostly true
- Don't know
- Mostly false
- Definitely false

**c. I expect my health to get worse**

- Definitely true
- Mostly true
- Don't know
- Mostly false
- Definitely false

**d. My health is excellent**

- Definitely true
- Mostly true
- Don't know
- Mostly false
- Definitely false

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**12. Which statement best describes your vision (with glasses or contact lenses if you wear them)?**

- I have no trouble seeing
- I have a little trouble seeing
- I have a lot of trouble seeing
- I am blind

**13. Which statement best describes your hearing (with a hearing aid if you use one)?**

- I have no trouble hearing
- I have a little trouble hearing
- I have a lot of trouble hearing
- I am deaf

**14. How tall are you?**

feet  inches

**15. How much do you weigh?**

pounds

**16. Has a doctor ever told you that you have arthritis?**

- Yes
- No

**17. Other than during pregnancy, has a doctor EVER told you that you have diabetes or sugar diabetes?**

- Yes
- No



18. Other than during pregnancy, has a doctor EVER told you that you have pre-diabetes or borderline diabetes?

- Yes
- No

19. Have you ever smoked cigarettes, cigars, or pipe tobacco?

- Yes
- No

20. Do you smoke cigarettes, cigars, or pipe tobacco now?

- Yes
- No

21. Have you had a flu shot in the past year?

- Yes
- No

*The next question is about actions your health care provider may have suggested that you take to improve your health.*

22. In the past 12 months, has a doctor, nurse, or other health care provider suggested you do any of the following?

*Please mark all that apply.*

- I have not visited a doctor or other health care professional in the past 12 months → **GO TO 23**
- Eat more healthful foods, such as fruits, vegetables, and whole grains
- Lose or gain weight
- Get regular exercise appropriate for your ability
- Improve your balance, such as to help prevent falls
- Manage health problems like arthritis, diabetes, high blood pressure
- None of these

*The next few questions are about your awareness of and enrollment in wellness programs to help you make a change based on your need.*

*Wellness programs are ongoing, organized group meetings or sessions, done online or in person, where the focus is on improving one's health through knowledge and/or activity. (Do not include diet or fitness programs done on an individual basis.)*

23. Besides your wellness program, do you know of any other wellness programs in your community or online to help people like you make these kinds of changes?

*Please mark all that apply.*

- Yes, in my community
- Yes, online
- No

24. Besides your wellness program, are you currently enrolled in any other wellness programs in your community or online to help you make this kind of change?

- Yes → **GO TO 25**
- No → **SKIP TO 26**

25. What other kind of wellness program are you currently enrolled in? This includes both community-based and online programs. *Please mark all that apply.*

- Eating healthful foods, such as fruits, vegetables, and whole grains
- Managing your weight
- Getting regular exercise appropriate for your ability
- Improve your balance and preventing falls
- Managing health problems like arthritis, diabetes, high blood pressure, or other conditions
- Other



### Making Health Care Decisions

The next questions are about making health care decisions. Your answers will help Medicare better understand how people use medical services. Please keep in mind that there are no right or wrong answers to these questions. Your opinions and experiences are important to us.

**26. How confident are you that you can identify when it is necessary for you to get medical care?**

- Very confident
- Confident
- Somewhat confident
- Not at all confident

**27. Do you always, usually, sometimes, or never take a list of all your prescribed medicines to your doctor visits?**

- Always
- Usually
- Sometimes
- Never
- I don't take any prescribed medications

### Your Beliefs

For each of the following statements, please mark the one response which fits you best:

**28. I will be able to achieve most of the goals that I have set for myself.**

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

**29. When facing difficult tasks, I am certain that I will accomplish them.**

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

**30. In general, I think that I can obtain outcomes that are important to me.**

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

**31. I believe I can succeed at almost anything that I set my mind to.**

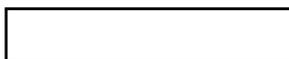
- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

**32. I will be able to successfully overcome many challenges.**

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

**33. I am confident that I can perform effectively on many different tasks.**

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree



**34. Compared to other people, I can do most tasks very well.**

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

**35. Even when things are tough, I can perform quite well.**

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

**How You've Been Feeling Lately**

The next two questions are about how you have been feeling lately.

**36. Over the last 2 weeks, how often have you been bothered by any of the following:**

**a. Little interest or pleasure in doing things?**

- Not at all
- Several days
- More than half the days
- Nearly every day

**b. Feeling down, depressed, or hopeless?**

- Not at all
- Several days
- More than half the days
- Nearly every day

**Physical Activity**

Physical activities are activities where you move and increase your heart rate above its resting rate, whether you do them for pleasure, work, or transportation. The following questions ask about the amount and intensity of physical activity you usually do. The intensity of the activity is related to the amount of energy you use to do these activities.

**Examples of physical intensity levels:**

Intensity level	Examples
<b>Light activities:</b> Your heart beats slightly faster than normal. You can talk and sing.	Walking leisurely, stretching, or light yard work
<b>Moderate activities:</b> Your heart beats faster than normal. You can talk but not sing.	Fast walking, aerobics class, strength training, swimming gently
<b>Vigorous activities:</b> Your heart rate increases a lot. You can't talk or your talking is broken up by large breaths.	Stair machine, jogging or running, tennis, racquetball, or badminton

**37. How physically active are you?**

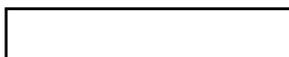
*Please mark one answer for each question.*

**a. I rarely or never do any physical activities.**

- Yes
- No

**b. I do some light or moderate physical activities, but not every week.**

- Yes
- No



c. I do some light physical activity every week.

- Yes
- No

d. I do moderate physical activities every week, but less than 30 minutes a day or 5 days a week.

- Yes
- No

e. I do vigorous physical activities every week, but less than 20 minutes a day or 3 days a week.

- Yes
- No

f. I do 30 minutes or more a day of moderate physical activities, 5 or more days a week.

- Yes
- No

g. I do 20 minutes or more a day of vigorous physical activities, 3 or more days a week.

- Yes
- No

h. I do activities to increase muscle strength, such as lifting weights or calisthenics, once a week or more.

- Yes
- No

i. I do activities to improve flexibility, such as stretching or yoga, once a week or more.

- Yes
- No

## Fall and Balance

38a. A fall is when your body goes to the ground without being pushed. Did you fall in the past 6 months?

- Yes →   times
- No → SKIP TO 39

38b. How many of these falls caused you to limit your regular activities for at least a day or to see a doctor?

- Falls limiting activity or requiring medical attention

39. In the past 6 months, have you had a problem with balance or walking?

- Yes
- No
- Limited to a bed or wheelchair  
↳ SKIP TO 43

40. Has your doctor or other health care provider done anything to help prevent falls or treat problems with balance or walking? Some things they might do include:

- Suggest that you use a cane or walker
- Check your blood pressure lying or standing
- Suggest that you do an exercise or physical therapy program
- Suggest a vision or hearing test

- Yes
- No

41. Are you afraid of falling?

- Yes
- No



### Your Confidence in Balance

The next questions are about keeping your balance in different situations. You may have to imagine yourself in these situations if you have not encountered them recently. For each one, choose any number between 0 (no confidence) and 100 (complete confidence) to say how confident you are that you could keep your balance. If you normally use a cane or walker or hold on to someone, answer as if you had that help.

0	10	20	30	40	50	60	70	80	90	100
No										Complete
Confidence										Confidence

42. How confident are you that you can maintain your balance and remain steady when you...

a. Stand on your tiptoes and reach for something above your head?

b. Stand on a chair and reach for something?

c. Are bumped into by people as you walk through the mall?

d. Step onto or off of an escalator while holding onto a railing?

e. Step onto or off of an escalator while holding a package so you cannot hold onto the railing?

f. Walk outside on icy sidewalks?

### Medicines

The next few questions are about medicines.

43. Do you ever forget to take your medicine?

- I don't take any medicines → **SKIP TO 47**
- Yes
- No

44. Do you ever have problems remembering to take your medicine?

- Yes
- No

45. When you feel better, do you sometimes stop taking your medicine?

- Yes
- No

46. Sometimes if you feel worse when you take your medicine, do you stop taking it?

- Yes
- No



### Getting Help From Others

47. People sometimes look to others for companionship, assistance, or other types of support. How often is each of the following kinds of support available to you if you need it?

a. Someone to help you if you were confined to bed?

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All of the time

b. Someone to take you to the doctor if you needed it?

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All of the time

c. Someone to prepare your meals if you were unable to do it yourself?

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All of the time

d. Someone to help with daily chores if you were sick?

- None of the time
- A little of the time
- Some of the time
- Most of the time
- All of the time

### Demographics

48. What is your sex?

- Male
- Female

The next two questions are about Hispanic origin and race.

49. Are you of Hispanic, Latino, or Spanish origin?

- Yes
- No

50. What is your race?

Please mark all that apply.

- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or other Pacific Islander
- White

51. When were you born? Please provide your date of birth in month/day/year.

<input type="text"/>	/	<input type="text"/>	/	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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month      day      year

52. How well do you speak English?

- Very well
- Well
- Not well
- Not at all

53. What is your current marital status?

- Married
- Living as married
- Divorced
- Separated
- Widowed
- Never married

54. What is the highest grade or level of school that you have completed?

- 8th grade or less
- Some high school, but did not graduate
- High school graduate or GED
- Some college or 2 year degree
- 4 year college graduate
- More than a 4 year college degree

**55. Where do you live?**

- House, apartment, condominium, mobile home
- Assisted living apartment or board care home → **SKIP TO 57**
- Other

**56. Do you live alone or with others?**

*Please mark all that apply.*

- Alone
- With spouse/significant other
- With adult children
- With other relatives
- With non-relatives

**57. What is your current employment status?**

- Employed at a job for pay, full-time
- Employed at a job for pay, part-time
- Homemaker, not currently working for pay
- Not currently employed, retired
- Not currently employed, not retired

**58. What type of health insurance do you currently have?**

*Please mark all that apply.*

- Medicare
- Medicaid (provided by state governments for low income individuals)
- A Medicare Supplemental plan
- A Medicare Advantage plan
- VA or Tricare
- Private health insurance (such as through an employer)
- Other
- None

**59. Do you currently provide care for someone else in your home?**

- Yes → **GO TO 60**
- No → **SKIP TO 61**

**60. During the past week, how many days did you provide at least some care?**

- No care provided in the last week
- 1 or 2 days
- 3 or 4 days
- 5 or 6 days
- 7 days (every day)

**61. Do you have difficulty getting to places you need to go?**

- No, I can drive, get a ride, take public transportation, or walk
- Yes, always or almost always
- Yes, sometimes

**62. As part of this study, we would like to obtain information on your use of health services and combine it with your survey responses. It will be very helpful to have the following two pieces of information that will help us identify your Medicare records. Your responses to these questions are voluntary. This information will be kept private and will be used only for our research. We will not share this information outside of this study.**

**a. Please provide the last four digits of your Social Security number:**

--	--	--	--

 (last 4 digits of SSN)

**b. Please provide your Medicare Health Insurance Claim (HIC) number:**

--

--

**63. Who completed this survey form?**

- Person who participated in the wellness program
- Family member or relative of person who participated in the wellness program
- Friend of person who participated in the wellness program
- Professional caregiver of person who participated in the wellness program

**64. Which of the following categories best represents the combined income for all family members in your household for the past 12 months?**

- \$11,670 or less
- \$11,671–\$15,730
- \$15,731–\$19,999
- \$20,000–\$29,999
- \$30,000–\$39,999
- \$40,000–\$49,999
- \$50,000–\$79,999
- \$80,000–\$99,999
- \$100,000 or more
- Don't know

**65. Date of completing this survey:**

		/			/	2	0		
month			day			year			

**Thank you for your time.  
Please return the survey to your  
program instructor.**



## C.3 Six-Month National Survey

### Start Here

- ▶ Please use a black or blue pen to complete this form.
- ▶ Mark  to indicate your answer. If you want to change your answer, darken the box  and mark the correct answer.

### Your Health

These first questions are about your health. Please mark one answer only. If you are unsure about how to answer a question, please give the best answer you can.

#### 1. In general, would you say your health is

- Excellent
- Very good
- Good
- Fair
- Poor

#### 2. Compared to one year ago, how would you rate your health in general now?

- Much better than one year ago
- Somewhat better now than one year ago
- About the same as one year ago
- Somewhat worse now than one year ago
- Much worse now than one year ago

#### 3. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

##### a. Vigorous activities, such as running, lifting heavy objects, or participating in strenuous sports

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### c. Lifting or carrying groceries

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### d. Climbing several flights of stairs

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### e. Climbing one flight of stairs

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### f. Bending, kneeling, or stooping

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### g. Walking more than a mile

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### h. Walking several hundred yards

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

17865



**i. Walking one hundred yards**

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

**j. Bathing or dressing yourself**

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

**4. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?**

**a. Cut down on the amount of time you spent on work or other activities**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**b. Accomplished less than you would like**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**c. Were limited in the kind of work or other activities**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**d. Had difficulty performing the work or other activities (for example, it took extra effort)**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**5. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?**

**a. Cut down on the amount of time you spent on work or other activities**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**b. Accomplished less than you would like**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**c. Did work or activities less carefully than usual**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time



6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

- Not at all
- Slightly
- Moderately
- Quite a bit
- Extremely

7. How much bodily pain have you had during the past 4 weeks?

- None
- Very mild
- Mild
- Moderate
- Severe
- Very severe

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

- Not at all
- A little bit
- Moderately
- Quite a bit
- Extremely

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the past 4 weeks...

a. Did you feel full of life?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

b. Have you been very nervous?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

c. Have you felt so down in the dumps that nothing could cheer you up?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

d. Have you felt calm and peaceful?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time



**e. Did you have a lot of energy?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**f. Have you felt downhearted and depressed?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**g. Did you feel worn out?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**h. Have you been happy?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**i. Did you feel tired?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**11. How TRUE or FALSE is each of the following statements for you?**

**a. I seem to get sick a little easier than other people**

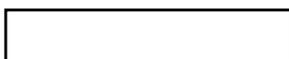
- Definitely true
- Mostly true
- Don't know
- Mostly false
- Definitely false

**b. I am as healthy as anybody I know**

- Definitely true
- Mostly true
- Don't know
- Mostly false
- Definitely false

**c. I expect my health to get worse**

- Definitely true
- Mostly true
- Don't know
- Mostly false
- Definitely false



**d. My health is excellent**

- Definitely true
- Mostly true
- Don't know
- Mostly false
- Definitely false

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**Physical Activity**

Physical activities are activities where you move and increase your heart rate above its resting rate, whether you do them for pleasure, work, or transportation. The following questions ask about the amount and intensity of physical activity you usually do. The intensity of the activity is related to the amount of energy you use to do these activities.

**Examples of physical intensity levels:**

Intensity Level	Examples
<b>Light activities:</b> Your heart beats slightly faster than normal. You can talk and sing.	Walking leisurely, stretching, or light yard work
<b>Moderate activities:</b> Your heart beats faster than normal. You can talk but not sing.	Fast walking, aerobics class, strength training, swimming gently
<b>Vigorous activities:</b> Your heart rate increases a lot. You can't talk or your talking is broken up by large breaths.	Stair machine, jogging or running, tennis, racquetball, or badminton

**12. How physically active are you?**

Please mark one answer for each question.

**a. I rarely or never do any physical activities.**

- Yes
- No

**b. I do some light or moderate physical activities, but not every week.**

- Yes
- No

**c. I do some light physical activity every week.**

- Yes
- No

**d. I do moderate physical activities every week, but less than 30 minutes a day or 5 days a week.**

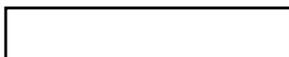
- Yes
- No

**e. I do vigorous physical activities every week, but less than 20 minutes a day or 3 days a week.**

- Yes
- No

**f. I do 30 minutes or more a day of moderate physical activities, 5 or more days a week.**

- Yes
- No



**g. I do 20 minutes or more a day of vigorous physical activities, 3 or more days a week.**

- Yes
- No

**h. I do activities to increase muscle strength, such as lifting weights or calisthenics, once a week or more.**

- Yes
- No

**i. I do activities to improve flexibility, such as stretching or yoga, once a week or more.**

- Yes
- No

**Falls**

**13. A fall is when your body goes to the ground without being pushed. Did you fall in the past 6 months?**

- Yes →   times
- No → **SKIP TO 15**

**14. How many of these falls caused you to limit your regular activities for at least a day or to see a doctor?**

Falls limiting activity or requiring medical attention

**15. In the past 6 months, have you had a problem with balance or walking?**

- Yes
- No
- Limited to a bed or wheelchair  
↳ **SKIP TO 18**

**16. Are you afraid of falling?**

- Yes
- No

**Your Confidence in Balance**

The next questions are about keeping your balance in different situations. You may have to imagine yourself in these situations if you have not encountered them recently. For each one, choose any number between 0 (no confidence) and 100 (complete confidence) to say how confident you are that you could keep your balance. If you normally use a cane or walker or hold on to someone, answer as if you had that help.

0	10	20	30	40	50	60	70	80	90	100
No										Complete
Confidence										Confidence

**17. How confident are you that you can maintain your balance and remain steady when you...**

**a. Stand on your tiptoes and reach for something above your head?**

**b. Stand on a chair and reach for something?**

**c. Are bumped into by people as you walk through the mall?**



d. Step onto or off of an escalator while holding onto a railing?

e. Step onto or off of an escalator while holding a package so you cannot hold onto the railing?

f. Walk outside on icy sidewalks?

### Medicines

The next few questions are about medicines.

18. Do you ever forget to take your medicine?

- I don't take any medicines → **SKIP TO 22**
- Yes
- No

19. Do you ever have problems remembering to take your medicine?

- Yes
- No

20. When you feel better, do you sometimes stop taking your medicine?

- Yes
- No

21. Sometimes if you feel worse when you take your medicine, do you stop taking it?

- Yes
- No

22. Have you participated in any program in the past 24 months, either in your community or online, to address any of the following goals?

*Please mark all that apply.*

- Eating healthful foods, such as fruits, vegetables, and whole grains
- Managing your weight
- Getting regular exercise appropriate for your ability
- Improving your balance and preventing falls
- Managing health problems like arthritis, diabetes, high blood pressure, or other conditions
- None of the above
- Other, Specify:

23. Date of filling out this survey:

/  / 20

month      day      year

**Thank you for your time.  
Please return the survey using  
the prepaid addressed envelope  
enclosed.**



## C.4 Six-Month Participant Survey

### Start Here

- ▶ Please use a black or blue pen to complete this form.
- ▶ Mark  to indicate your answer. If you want to change your answer, darken the box  and mark the correct answer.

### Your Health

These first questions are about your health. Please mark one answer only. If you are unsure about how to answer a question, please give the best answer you can.

#### 1. In general, would you say your health is

- Excellent
- Very good
- Good
- Fair
- Poor

#### 2. Compared to one year ago, how would you rate your health in general now?

- Much better than one year ago
- Somewhat better now than one year ago
- About the same as one year ago
- Somewhat worse now than one year ago
- Much worse now than one year ago

#### 3. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

##### a. Vigorous activities, such as running, lifting heavy objects, or participating in strenuous sports

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### c. Lifting or carrying groceries

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### d. Climbing several flights of stairs

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### e. Climbing one flight of stairs

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### f. Bending, kneeling, or stooping

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### g. Walking more than a mile

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

##### h. Walking several hundred yards

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all



**i. Walking one hundred yards**

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

**j. Bathing or dressing yourself**

- Yes, limited a lot
- Yes, limited a little
- No, not limited at all

**4. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?**

**a. Cut down on the amount of time you spent on work or other activities**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**b. Accomplished less than you would like**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**c. Were limited in the kind of work or other activities**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**d. Had difficulty performing the work or other activities (for example, it took extra effort)**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**5. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?**

**a. Cut down on the amount of time you spent on work or other activities**

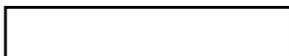
- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**b. Accomplished less than you would like**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**c. Did work or activities less carefully than usual**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time



6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

- Not at all
- Slightly
- Moderately
- Quite a bit
- Extremely

7. How much bodily pain have you during the past 4 weeks?

- None
- Very mild
- Mild
- Moderate
- Severe
- Very severe

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

- Not at all
- A little bit
- Moderately
- Quite a bit
- Extremely

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the past 4 weeks...

a. Did you feel full of life?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

b. Have you been very nervous?

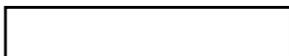
- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

c. Have you felt so down in the dumps that nothing could cheer you up?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

d. Have you felt calm and peaceful?

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time



**e. Did you have a lot of energy?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**f. Have you felt downhearted and depressed?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**g. Did you feel worn out?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**h. Have you been happy?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**i. Did you feel tired?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?**

- All of the time
- Most of the time
- Some of the time
- A little of the time
- None of the time

**11. How TRUE or FALSE is each of the following statements for you?**

**a. I seem to get sick a little easier than other people**

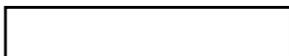
- Definitely true
- Mostly true
- Don't know
- Mostly false
- Definitely false

**b. I am as healthy as anybody I know**

- Definitely true
- Mostly true
- Don't know
- Mostly false
- Definitely false

**c. I expect my health to get worse**

- Definitely true
- Mostly true
- Don't know
- Mostly false
- Definitely false



**d. My health is excellent**

- Definitely true
- Mostly true
- Don't know
- Mostly false
- Definitely false

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SF-36<sup>®</sup> is a registered trademark of Medical Outcomes Trust. (SF-36v2<sup>®</sup> Health Survey Standard, United States (English))

**Physical Activity**

Physical activities are activities where you move and increase your heart rate above its resting rate, whether you do them for pleasure, work, or transportation. The following questions ask about the amount and intensity of physical activity you usually do. The intensity of the activity is related to the amount of energy you use to do these activities.

**Examples of physical intensity levels:**

Intensity Level	Examples
<b>Light activities:</b> Your heart beats slightly faster than normal. You can talk and sing.	Walking leisurely, stretching, or light yard work
<b>Moderate activities:</b> Your heart beats faster than normal. You can talk but not sing.	Fast walking, aerobics class, strength training, swimming gently
<b>Vigorous activities:</b> Your heart rate increases a lot. You can't talk or your talking is broken up by large breaths.	Stair machine, jogging or running, tennis, racquetball, or badminton

**12. How physically active are you?**

Please mark one answer for each question.

**a. I rarely or never do any physical activities.**

- Yes
- No

**b. I do some light or moderate physical activities, but not every week.**

- Yes
- No

**c. I do some light physical activity every week.**

- Yes
- No

**d. I do moderate physical activities every week, but less than 30 minutes a day or 5 days a week.**

- Yes
- No

**e. I do vigorous physical activities every week, but less than 20 minutes a day or 3 days a week.**

- Yes
- No

**f. I do 30 minutes or more a day of moderate physical activities, 5 or more days a week.**

- Yes
- No



**g. I do 20 minutes or more a day of vigorous physical activities, 3 or more days a week.**

- Yes
- No

**h. I do activities to increase muscle strength, such as lifting weights or calisthenics, once a week or more.**

- Yes
- No

**i. I do activities to improve flexibility, such as stretching or yoga, once a week or more.**

- Yes
- No

**Falls**

**13. A fall is when your body goes to the ground without being pushed. Did you fall in the past 6 months?**

- Yes →   times
- No → **SKIP TO 15**

**14. How many of these falls caused you to limit your regular activities for at least a day or to see a doctor?**

Falls limiting activity or requiring medical attention

**15. In the past 6 months, have you had a problem with balance or walking?**

- Yes
- No
- Limited to a bed or wheelchair  
↳ **SKIP TO 18**

**16. Are you afraid of falling?**

- Yes
- No

**Your Confidence in Balance**

The next questions are about keeping your balance in different situations. You may have to imagine yourself in these situations if you have not encountered them recently. For each one, choose any number between 0 (no confidence) and 100 (complete confidence) to say how confident you are that you could keep your balance. If you normally use a cane or walker or hold on to someone, answer as if you had that help.

0	10	20	30	40	50	60	70	80	90	100
No										Complete
Confidence										Confidence

**17. How confident are you that you can maintain your balance and remain steady when you...**

**a. Stand on your tiptoes and reach for something above your head?**

**b. Stand on a chair and reach for something?**

**c. Are bumped into by people as you walk through the mall?**



d. Step onto or off of an escalator while holding onto a railing?

e. Step onto or off of an escalator while holding a package so you cannot hold onto the railing?

f. Walk outside on icy sidewalks?

## Medicines

The next few questions are about medicines.

18. Do you ever forget to take your medicine?

- I don't take any medicines → **SKIP TO 22**
- Yes
- No

19. Do you ever have problems remembering to take your medicine?

- Yes
- No

20. When you feel better, do you sometimes stop taking your medicine?

- Yes
- No

21. Sometimes if you feel worse when you take your medicine, do you stop taking it?

- Yes
- No

## Program Participation

*Wellness programs are ongoing, organized group meetings or sessions, done online or in person, where the focus is on improving one's health through knowledge and/or activity. (Do not include diet or fitness programs done on an individual basis.)*

22. Our records show that you started a wellness program in [FILL Month, yyyy]. How many of the program sessions or meetings did you participate in?

- All sessions or meetings
- Most of the sessions or meetings
- Half of the sessions or meetings
- Fewer than half of the sessions or meetings

23. Are you still participating in this program?

- Yes → **SKIP TO 33**
- No → **GO TO 24a**

24a. Besides the above program, have you participated in any other wellness programs, either in your community or online, to improve your health in the past six months?

*Please mark all that apply.*

- Yes, in my community → **GO TO 24b**
- Yes, online → **GO TO 24b**
- No → **SKIP TO 25**



**24b. What other kind of wellness programs did you participate in in the past six months?**

*Please mark all that apply.*

- Eating healthful foods, such as fruits, vegetables, and whole grains
- Managing your weight
- Getting regular exercise appropriate for your ability
- Improving your balance and preventing falls
- Managing health problems like arthritis, diabetes, high blood pressure, or other conditions
- None of the above
- Other, Specify:

**25. How much would you be willing to pay in total for the program that you enrolled in?**

*Please write a whole dollar amount.*

\$

**26. What would you say was the best thing about the program?**

*Please specify in the space below.*

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**27. Did you stop participating in the program when it was over or before it was over?**

- I stopped participating in the program when it was over → **SKIP TO 33**
- I stopped participating in the program before it was over → **GO TO 28**

**28. Did you decide to leave the program because of your ill health?**

- Yes
- No

**29a. Did you decide to leave the program because it did not meet your health needs?**

- Yes → **GO TO 29b**
- No → **SKIP TO 30**

**29b. In what ways did the program fail to meet your health needs?**

*Please specify in the space below.*

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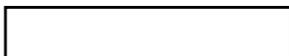
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30. Below is a list of possible reasons why someone might leave the program. For each, please select how important it was in YOUR decision to leave the program.

Possible reasons why someone might leave the program	Very important in my decision	Somewhat important in my decision	Not at all important in my decision
a. The instructor was not helpful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. I did not learn anything new	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. I did not achieve the results I expected	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Parking was a problem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. The program location was too far	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Transportation was a problem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. The program hours were not convenient to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. The program was not offered in my main spoken language	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Not enough people in the program were the same gender as myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Not enough people in the program were in my age group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. The instructor was not in my age group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. The instructor was not the same gender as myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m. The program cost was too high	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



**31. Please use the space below to describe any other reasons you had for deciding to leave the program.**


**32. What would it take for you to return to the program? Please list anything that comes to mind when thinking about what it would take for you to return to the program.**


**33. Date of completing this survey:**

<input type="text"/>	<input type="text"/>	/	<input type="text"/>	<input type="text"/>	/	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
month			day			2	0		year

**Thank you for your time.  
Please mail the survey using the  
prepaid addressed envelope  
enclosed.**

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## APPENDIX D – SAMPLING AND WEIGHTING

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Appendix D describes the sampling and weighting process for the baseline national survey. We use jackknife variance estimation based on a set of replicate weights, a common resampling procedure for complex survey designs.<sup>35</sup>

### **Sampling and Base Weight Calculation**

The base weight was generated from three weights corresponding to the phases of sampling:

- (1) **First-phase sampling and sampling weight:** Acumen selected a one percent sample ( $n=413,467$ ) from the set of all Medicare beneficiaries meeting the sample selection eligibility requirements. The weight associated with this phase of sample selection was thus 100.
- (2) **Second-phase sampling and sampling weight:** Beneficiaries who were institutionalized or had enrollment status of neither FFS nor MA were excluded from the first-phase sample, leaving  $n=376,379$  in the second-phase sample.

Two strata were formed in the second-phase sample:

- *Stratum 1* consisted of all females with diabetes ( $n=45,712$ ). From this, a sample of 10,800 beneficiaries was selected.
- *Stratum 2* contained the remainder ( $n=330,667$ ). From this, a sample of 38,400 was selected.

The second-phase sample weight is the inverse of the sampling probability used to select the second-phase sample, consisting of 49,200 beneficiaries.

- (3) **Third-phase sampling and sampling weight:** Each of the two strata were randomly assigned to one of 12 waves. Each wave of Stratum 1 contained 900 beneficiaries and each wave of Stratum 2 contained 3,200 beneficiaries. Once all Phase 2 sample members were assigned to a wave, the Acumen team drew the Phase 3 sample of 19,512 beneficiaries systematically from the Phase 2 sample sorted by sex, age group, and Census Bureau region. The final sample sizes fielded for Wave 1 were 330 and 1,230 beneficiaries for Strata 1 and 2, respectively. The sample fielded for Wave 1 was selected independently from the samples for Waves 2-12. The third-phase sampling weight is the inverse of the third-phase sampling probability.

The unconditional base weight that was used for the national survey is the multiple of three weights discussed above.

$$\text{BASEWT} = \text{WT\_PHASE1} * \text{WT\_PHASE2} * \text{WT\_PHASE3}$$

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<sup>35</sup> Wolter, K.M. (2007). *Introduction to Variance Estimation*. Springer: New York.

## Formation of Jackknife Replicate and Replicate Weights

To facilitate the variance estimation, we formed jackknife replicates and calculated their replicate weights.

In a multi-stage design, where the primary sampling units (PSUs) are selected at the first stage, the jackknife variance estimator is generated by forming replicates using the PSU sample. PSU sample sizes are often small, so the number of replicates formed is usually fairly manageable. In our case, however, a multi-stage sample design was not used, so the PSU sample size and the number of replicates were too large. To overcome this challenge, we grouped the sampling units into clusters, called variance units, using the random group method<sup>36</sup> and generated 30 replicates for Stratum 1 and 70 replicates for Stratum 2 (100 total).

For each beneficiary ( $j$ ), 100 jackknife replicate weights (denoted as  $w_{ij}^*$ ,  $i = 1, 2, \dots, 100$ ) are defined by taking the base sampling weight ( $w_j$ ) and modifying it depending on which stratum and replicate unit  $j$  belongs to. Specifically,

$$w_{ij}^* = \begin{cases} 0 & \text{if } j \in i, i \in h \\ \frac{m_h}{m_h - 1} w_j & \text{if } j \notin i, i \in h \\ w_j & \text{if } j \notin i, i \notin h \end{cases}$$

where  $h$  indicates Stratum 1 or 2 and  $m_h$  is the number of random groups (variance units) in Stratum  $h$ , that is,  $m_1 = 30$  and  $m_2 = 70$ .

## Nonresponse Adjustment Weighting

Weights were then adjusted for differences between respondents and non-respondents. To carry out the nonresponse weighting adjustment, we classified the sample into four possible dispositions from the beneficiary sample: 1) respondent, 2) eligible non-respondent, 3) non-respondent with unknown eligibility, and 4) ineligible. The distribution of these four possible dispositions can be found in Appendix Table D.1.

**Appendix Table D.1: Distribution of the Final Sample before Imputation**

Disposition	Definition	Frequency	Percent
1	Respondent	9,203	47.2
2	Eligible non-respondent	2,109	10.8
3	Non-respondent with unknown eligibility	7,198	36.9
4	Ineligible	1,002	5.1

<sup>36</sup> In this method, the sample is randomly divided into a number of (nearly) equal sized groups. Then the random groups are treated as sampling clusters (or PSUs) to be used as variance units. Replicates are then formed using the random groups, resulting in a significantly reduced number of replicates.

To determine the eligibility status of the 7,198 eligible non-respondents with unknown eligibility, we used imputation, which uses all available auxiliary variables in the sampling frame. Out of 7,198 non-respondents with unknown eligibility, 6,655 cases were imputed to be eligible non-respondents and 543 cases were imputed to be ineligible. The redefined distribution of the sample after imputation is shown in Appendix Table D.2.

**Appendix Table D.2: Distribution of the Final Sample after Imputation**

Revised Disposition	Definition	Frequency	Percent
1	Respondent	9,203	47.2
2	Eligible non-respondent	8,764	44.9
4	Ineligible	1,545	7.9

The weighting class method was used to calculate the nonresponse weighting adjustment. The weighting classes can be formed using different methods (e.g., propensity score modeling). We used a new emerging method called the classification and regression tree algorithm,<sup>37</sup> which has an advantage of easily handling a large number of auxiliary variables and interaction terms. Out of over 100 variables, only three variables (region, age, and dementia) discriminated between respondents and nonrespondents to define the tree. Respondent weights are adjusted for these three characteristics. Four weight classes were created using these variables:

- (1) Weight class 1: Midwest Census region
- (2) Weight class 2: Age 66-69
- (3) Weight class 3: HCC 52 for dementia without complication
- (4) Weight class 4: All others

After removing ineligible beneficiaries, nonresponse weighting adjustment was done using the formula below. For weighting class  $k$ , the nonresponse adjusted weight,  $\tilde{w}_j$ , for beneficiary  $j$  in the weighting class is given by

$$\tilde{w}_j = \frac{\sum_{j' \in S_k} w_{j'}}{\sum_{j' \in R_k} w_{j'}} w_j$$

Where  $R_k$  is the respondent set and  $S_k$  is the sample in Weighting Class  $k$ . The replicate weights are adjusted in the same way:

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<sup>37</sup> Loh, W.Y. (2009). Improving the precision of classification trees. *Annals of Applied Statistics*, 3, 1710-1737.

$$\tilde{w}_{ij}^* = \frac{\sum_{j' \in S_k} w_{ij'}^*}{\sum_{j' \in R_k} w_{ij'}^*} w_{ij}^*$$

for  $i = 1, 2, \dots, 100$ .

## APPENDIX E – COMPARISON GROUP SELECTION METHODOLOGY

This appendix discusses the methodology for identifying comparison groups of beneficiaries for evaluation purposes. These comparison groups, together with wellness program participants, formed the samples used in the 6-month impact analyses (see Section 4).

As an initial step, a comparison pool for each ACA priority area was drawn from the baseline sample of national survey respondents. For all ACA priority areas, national survey respondents who reported being likely or very likely to sign up for a wellness program were included in the comparison pool. For each ACA priority area, different questions related to respondents’ readiness to affect lifestyle changes were also used to populate the respective comparison pool. For chronic disease management (CDM) programs, the comparison pool included anyone who reported currently trying to make a change, or recently having made a change, or thinking about making a change in their diet, the management of their health condition, or their weight. For falls prevention (FP) programs, the comparison pool included anyone who was already following an exercise program, or was thinking about following an exercise program, to improve balance. For physical activity, nutrition and obesity (PANO) programs, the comparison pool included beneficiaries who reported currently trying to make a change, or recently having made a change, or thinking about making a change in their diet, their weight management, or the amount of exercise they got in order to stay healthy.

This initial selection process resulted in different comparison pools for each ACA priority area (see Appendix Table E.1). Depending on the priority area and the beneficiary’s Medicare cohort (FFS or non-FFS), the comparison pools were limited to between 54 and 78 percent of the initial baseline sample of national survey respondents.

**Appendix Table E.1: National Survey Respondents Available for Matching by ACA Priority Area**

Sample Description	Number of Potential Beneficiaries	Percent of National Survey
Baseline National Survey, Medicare FFS	5,765	100%
Baseline National Survey, Medicare non-FFS	3,433	100%
Candidates for matching, CDM Programs, Medicare FFS	4,396	76.3%
Candidates for matching, CDM Programs, Medicare non-FFS	2,682	78.1%
Candidates for matching, FP Programs, Medicare FFS	3,123	54.2%
Candidates for matching, FP Programs, Medicare non-FFS	1,923	56.0%
Candidates for matching, PANO Programs, Medicare FFS	4,285	74.3%
Candidates for matching, PANO Programs, Medicare non-FFS	2,625	76.5%

After a comparison pool was identified for each ACA priority area, 1:1 propensity score matching was applied to identify pairs of national survey and wellness program participants who were similar across many observable characteristics, based on information from Medicare claims

data and survey questionnaires. Medicare FFS and non-FFS beneficiaries were matched separately, because the available information for these two cohorts is different.

The matching model estimates the probability that, in the sample comprised of beneficiaries who are program participants and beneficiaries in the comparison pool, a beneficiary  $i$  is a wellness program participant given observed covariates  $X_i$ . If  $D_i=1$  for beneficiaries in wellness programs, and  $D_i=0$  for beneficiaries in the comparison pool,  $\Pr(D_i=1|X_i)$  is estimated using logistic regression, as per the following model:

$$\Pr(D_i = 1|X_i) = \frac{e^{\lambda X_i}}{1 + e^{\lambda X_i}}$$

where  $X_i$  is a vector of observed covariates for beneficiary  $i$ , and  $\lambda$  represents a vector of estimation parameters, including a constant. This estimated probability is the propensity score.

The exact covariates used in the matching model varied depending on the ACA priority area and data availability, as well as the extent to which there were significant differences across participants and the comparison pool along a particular dimension. Generally speaking, these covariates included information on demographics, medical conditions, health service utilization, medical expenditures (based on Medicare claims data), and various self-reported measures of income, education levels, physical and mental health status, smoking behavior, and overweight/obese indicators, as recorded in the baseline national and participant surveys.<sup>38,39</sup> In some cases, information from surveys was combined with information from Medicare claims data in the matching model. For example, the existence of diabetes and pre-diabetes was determined using both self-reported information from surveys, as well as a claims-based algorithm. The matching model also included seasonality variables to account for the fact that wellness programs, unlike the national survey, did not enroll participants uniformly over the course of a calendar year.

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<sup>38</sup> There are differences in data availability for FFS and non-FFS beneficiaries, and the matching models were adjusted accordingly. For example, the model for FFS beneficiaries included many diagnosis and procedure codes from Medicare claims available in the Common Working File (CWF), grouped in categories according to the Clinical Classifications Software (CCS), which was developed as part of The Healthcare Cost and Utilization Project (HCUP). Such information is not reliably available for non-FFS beneficiaries, so Risk Adjustment System (RAS) data were used instead, and condition classifications, developed in the context of the CMS-HCC model, were employed to match beneficiaries on the presence of various medical conditions. In addition, data on medical expenditure or durable medical equipment (e.g., home oxygen) were not available for non-FFS beneficiaries, whereas they were included in the matching model for FFS beneficiaries.

<sup>39</sup> To the extent possible, survey-based variables were included in the matching model as categorical variables, with one category always representing missing values for that variable. This was done in an effort to preserve sample size. The only variables not entering the model in this way were the physical and mental health component summary variables.

Once propensity scores were estimated, beneficiaries were matched using the value of their propensity scores. Exact matching was imposed for particularly important variables (gender, race, ethnicity, and age category).<sup>40</sup> Appendix Table E.2 lists the characteristics that were matched exactly, by each priority area and beneficiary type (FFS or non-FFS).

**Appendix Table E.2: Characteristics Exactly Matched in Matching Model**

Characteristics	CDM		FP		PANO	
	FFS	Non-FFS	FFS	Non-FFS	FFS	Non-FFS
<b>Age</b>						
% Age under 65	X	X				
% Age 65-69	X	X			X	X
% Age 70-74	X	X			X	X
% Age 75-79	X	X			X	X
% Age 80+	X	X			X	X
<b>Sex:</b> % Female	X	X	X	X	X	X
<b>Race</b>						
% White	X	X	X	X	X	X
% Black/African American	X	X	X	X	X	X
% Other	X	X	X	X	X	X
<b>Ethnicity</b>						
% Hispanic	X	X	X	X	X	X
% Non-Hispanic	X	X	X	X	X	X

Among comparison beneficiaries who matched exactly on these variables, the matching algorithm then selected the nearest neighbor among beneficiaries with propensity scores within a caliper of at most 0.2 standard deviations of the propensity score of the intervention beneficiary. This approach ensured covariate balance over a large variety of important predictive characteristics while also ensuring exact matches on particularly important variables. Intervention group beneficiaries without a matched comparison group beneficiary were excluded from the analysis. The matching algorithm identified a well-balanced baseline sample of participant and comparison beneficiaries for the analyses presented in Section 4. Matching model covariates were, with very few exceptions, well-balanced between participants and the comparison groups in terms of their average post-matching values. Even variables that did not explicitly enter the matching model were balanced, lending credibility to the validity of the matching algorithm. For example, even though Medicare Part D information was not incorporated in the matching model, prescription drug expenditure and prescription drug history

<sup>40</sup> Due to the skewed age distribution in Falls Prevention programs, exact matching on age could not be imposed for this priority area without resulting in a very small sample of matched participants and comparison. As a result, age was used as a covariate in the matching model for Falls Prevention programs.

for most drug classes were balanced between matched participant and comparison beneficiaries.<sup>41</sup>

Depending on the program, 23 to 36 percent of participants could not be appropriately matched to a national survey respondent in the comparison pool. This is largely explained by a lack of sufficient national survey respondents with similar characteristics along the dimensions taken into account in the matching algorithm. For example, over 40 percent of unmatched participants in CDM Programs (Medicare FFS cohort) were black, whereas there were fewer than 6 percent black beneficiaries among unmatched beneficiaries in the comparison pool.<sup>42</sup> In addition, the prevalence of diabetes among unmatched participants in these programs was over 57 percent, whereas it was less than 28 percent among unmatched beneficiaries in the comparison pool.

Appendix Table E.3 through Appendix Table E.8 display participant sample sizes pre- and post-matching as well as select characteristics pre- and post-matching for each priority area and beneficiary cohort.<sup>43</sup> Each table includes sample averages in the comparison group (CG) and intervention group (IG) for characteristics grouped by categories of interest, along with the standardized mean difference (SMD).<sup>44</sup> Each table also includes information on whether each characteristic was included in the matching model.

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<sup>41</sup> Based on data from beneficiaries for whom Medicare Part D information is available.

<sup>42</sup> Baseline samples prior to matching included 6.8 percent black beneficiaries among national survey respondents, and 22.5 percent among program participants. In the matched sample, 15 percent of beneficiaries are black both among participants and among Comparison.

<sup>43</sup> The matching model included many more claims- and survey-based variables than presented in the tables below. The characteristics listed here were selected based on each priority area's targeting criteria and goals. A "missing value" category was also created for each categorical survey variable included in the matching model. The "missing value" category is omitted from these tables.

<sup>44</sup> A standardized mean difference (SMD) less than 0.10 is considered acceptable for a well-balanced sample.

**Appendix Table E.3: Chronic Disease Management Pre-matched and Post-matched  
Summary for FFS Population**

Characteristics	Included in Matching Model	Pre-Matching			Post-Matching		
		CG*	IG*	SMD*	CG*	IG*	SMD*
<i>Number of Beneficiaries</i>		4,396	750		533	533	
<i>% Dual Eligible</i>	Y	8.21	14.0	0.20	12.6	10.5	0.06
<i>% Married</i>	N	57.44	39.20	0.37	44.47	45.03	0.01
<i>Area Deprivation Index</i>	Y	98.77	101.08	0.12	101.24	100.43	0.05
<i>Annual Household Income</i>							
% less than \$11,670	Y	6.07	9.87	0.15	10.69	8.26	0.08
% \$11,671-\$15,730	Y	6.10	6.93	0.03	8.07	6.19	0.07
% \$15,731-\$19,999	Y	5.03	6.53	0.07	5.63	7.69	0.08
% \$20,000-\$29,999	Y	11.9	9.33	0.08	10.9	9.76	0.04
% \$30,000-\$39,999	Y	10.6	6.80	0.13	5.63	7.50	0.08
% \$40,000-\$49,999	Y	8.94	5.87	0.11	7.88	7.32	0.02
% \$50,000-\$79,999	Y	15.3	12.1	0.09	13.1	13.8	0.02
% \$80,000-\$99,999	Y	5.91	3.73	0.09	3.56	4.32	0.04
% \$100,000 or more	Y	9.80	4.13	0.20	4.32	5.44	0.05
<i>Education</i>							
% Less than high school	Y	11.90	11.87	0.00	12.76	11.82	0.03
% High school/GED	Y	30.69	26.13	0.10	29.64	27.02	0.06
% Some College	Y	26.09	29.87	0.09	31.33	32.83	0.03
% College or more	N	28.64	23.20	0.12	23.45	25.89	0.06
<i>Resource Utilization</i>							
E&M Visits: % 0	Y	5.07	2.13	0.14	2.25	2.44	0.01
E&M Visits: % 1-5	Y	33.26	22.93	0.22	26.08	23.64	0.06
E&M Visits: % 6-10	N	28.14	31.73	0.08	32.08	32.08	0.00
E&M Visits: % 11-15	Y	17.06	20.27	0.08	18.39	20.64	0.06
E&M Visits: % 16+	Y	16.47	22.93	0.17	21.20	21.20	0.00
ER Visits: % 1	Y	15.67	17.60	0.05	17.26	18.01	0.02
ER Visits: % 2+	Y	7.21	10.27	0.11	10.69	9.19	0.05
<i>Expenditures</i>							
IP Cost	Y	1,904	1,602	0.04	1,800	1,897	0.02
Total Cost	Y	7,122	7,243	0.01	7,450	7,881	0.03
Part D cost	N	1,820	2,633	0.11	3,051	2,656.	0.04
<i>Drug Utilization</i>							
% Cardiotonics	N	8.28	14.88	0.23	15.14	13.92	0.03
% ARBs	N	25.31	29.58	0.10	29.24	28.86	0.01
% Antihypertensives	N	8.21	12.16	0.14	10.97	11.39	0.01
% Antidiabetics	N	22.23	34.30	0.28	33.68	33.67	0.00

Characteristics	Included in Matching Model	Pre-Matching			Post-Matching		
		CG*	IG*	SMD*	CG*	IG*	SMD*
% Statin	N	62.67	65.88	0.07	63.19	64.56	0.03
<b>Health Behavior</b>							
% Non-Smokers	Y	46.0	55.2	0.18	54.4	54.03	0.1
% Low Adherence	Y	20.29	29.33	0.22	26.64	28.52	0.04
% Moderate Adherence	Y	21.47	23.20	0.04	25.52	22.89	0.06
% High Adherence	N	48.98	38.67	0.21	42.59	41.46	0.02
Patient Activation Score: % High	Y	33.94	37.33	0.07	33.96	36.40	0.05
Patient Activation Score: % Complacent	Y	6.14	5.73	0.02	6.38	4.32	0.09
Patient Activation Score: % Active	Y	45.86	44.00	0.04	49.34	47.47	0.04
Patient Activation Score: % Passive	Y	6.82	7.33	0.02	6.57	6.94	0.01
<b>HCC score (V22, 2015 RAS data)</b>	Y	1.07	1.23	0.17	1.22	1.21	0.00
<b>Clinical Profile<sup>†</sup></b>							
General health now compared to one year ago: % much better	Y	5.35	9.87	0.19	9.38	8.63	0.03
General health now compared to one year ago: % somewhat better	Y	12.24	14.93	0.08	13.88	14.26	0.01
General health now compared to one year ago: % about the same	Y	61.31	49.47	0.24	54.22	51.59	0.05
General health now compared to one year ago: % somewhat worse	Y	17.42	22.40	0.13	19.51	22.70	0.08
General health now compared to one year ago: % much worse	Y	2.53	2.53	0.00	2.63	2.25	0.02
Physical Component Summary	Y	42.27	40.95	0.13	41.54	40.77	0.08
Mental Component Summary	Y	51.64	50.68	0.09	51.40	50.88	0.05
% Pre-diabetes <sup>‡</sup>	Y	10.15	10.00	0.00	11.44	10.51	0.03
% Diabetes <sup>‡</sup>	Y	30.28	50.67	0.44	47.84	48.03	0.00
% Underweight – BMI < 18.5	N	1.68	1.07	0.05	2.63	1.31	0.09
% Normal weight – 18.5 < BMI < 25	N	26.39	20.27	0.14	21.76	20.26	0.04
% Overweight – 25 < BMI < 30	Y	37.08	29.87	0.15	32.65	31.33	0.03
% Obese – BMI > 30	Y	31.23	44.40	0.28	40.15	43.15	0.06
% Arthritis Present	Y	74.5	80.9	0.15	77.9	80.1	0.06
% Diseases of the heart	Y	46.93	52.27	0.11	48.59	50.84	0.04
% Essential hypertension	Y	74.09	85.47	0.27	84.43	83.86	0.02
% Hypertension with complications and secondary hypertension	Y	13.67	18.53	0.14	16.51	16.89	0.01
% Cardiac Dysrhythmias/arrest/ventricular fibrillation, 1 year prior, any setting	Y	28.80	30.27	0.03	28.71	30.02	0.03
% Congestive heart failure; non-hypertensive	Y	10.87	9.07	0.06	9.76	9.38	0.01
% Chronic obstructive pulmonary disease	Y	21.88	25.60	0.09	24.02	25.70	0.04
% Other lower respiratory disease	Y	34.14	39.20	0.11	36.21	37.90	0.03
% Other upper respiratory disease	Y	17.68	21.60	0.10	20.64	21.95	0.03

Characteristics	Included in Matching Model	Pre-Matching			Post-Matching		
		CG*	IG*	SMD*	CG*	IG*	SMD*
% Circulatory or heart condition	Y	22.47	26.67	0.10	23.45	25.14	0.04
% Pulmonary heart disease	Y	4.66	4.40	0.01	4.50	4.50	0.00
% Cardiac Dysrhythmias/arrest/ventricular fibrillation	Y	28.80	30.27	0.03	28.71	30.02	0.03
% Congestive heart failure; non-hypertensive	Y	10.87	9.07	0.06	9.76	9.38	0.01
Charlson Comorbidity Score	Y	21.06	21.73	0.01	22.51	21.95	0.01
<b>Seasonal Variation in Index Date</b>							
Season based on index date: % Winter	N	24.93	15.07	0.23	15.76	16.14	0.01
Season based on index date: % Spring	Y	25.73	29.47	0.08	30.02	29.83	0.00
Season based on index date: % Summer	Y	25.86	21.87	0.09	22.89	23.64	0.02
Season based on index date: % Fall	Y	23.48	33.60	0.23	31.33	30.39	0.02

\* CG: Comparison Group; IG: Intervention Group; SMD: Standardized Mean Difference

+ FFS service utilization, expenditure, and clinical profile information is based on diagnosis and procedure codes from Medicare claims (for service dates one year prior to the index date) available in the Common Working File (CWF), grouped in condition categories according to the Clinical Classifications Software (CCS), which was developed as part of The Healthcare Cost and Utilization Project (HCUP).

‡ Diabetes status was determined using an algorithm combining claims data and self-reported information from surveys.

**Appendix Table E.4: Chronic Disease Management Pre-matched and Post-matched  
Summary for non-FFS Population**

Characteristics	Included in Matching Model	Pre-Matching			Post-Matching		
		CG*	IG*	SMD*	CG*	IG*	SMD*
<i>Number of Beneficiaries</i>		2,682	596		387	387	
<i>% Dual Eligible</i>	Y	11.11	30.70	0.57	22.22	21.19	0.03
<i>% Married</i>	N	54.44	29.03	0.52	38.50	36.95	0.03
<i>Area Deprivation Index</i>	Y	98.54	100.60	0.12	99.63	100.39	0.05
<i>Annual Household Income</i>							
% less than \$11,670	Y	8.28	22.48	0.46	15.25	16.80	0.04
% \$11,671-\$15,730	Y	7.46	13.42	0.21	13.44	11.37	0.06
% \$15,731-\$19,999	Y	7.20	6.54	0.03	6.46	6.72	0.01
% \$20,000-\$29,999	Y	13.46	8.56	0.15	11.37	10.59	0.02
% \$30,000-\$39,999	Y	11.26	6.21	0.17	9.04	7.75	0.05
% \$40,000-\$49,999	Y	9.55	4.53	0.18	4.91	6.46	0.07
% \$50,000-\$79,999	Y	13.53	5.70	0.24	9.04	8.27	0.03
% \$80,000-\$99,999	Y	4.06	1.34	0.15	0.78	2.07	0.11
% \$100,000 or more	Y	5.26	1.51	0.18	3.10	2.33	0.05
<i>Education</i>							
% Less than high school	Y	16.33	21.14	0.13	20.67	18.86	0.05
% High school/GED	Y	32.62	24.16	0.18	27.13	28.17	0.02
% Some College	Y	25.84	26.85	0.02	26.10	30.75	0.10
% College or more	N	21.29	16.61	0.12	19.12	17.31	0.05
<i>Health Behavior</i>							
% Non-Smokers	Y	47.58	55.70	0.16	54.52	54.52	0.00
% Low Adherence	Y	19.24	29.70	0.26	26.61	25.06	0.04
% Moderate Adherence	Y	20.36	19.30	0.03	19.38	19.90	0.01
% High Adherence	N	49.70	39.93	0.20	42.38	43.67	0.03
Patient Activation Score: % High	Y	31.28	32.38	0.02	28.94	31.78	0.06
Patient Activation Score: % Complacent	Y	8.58	8.72	0.01	9.56	9.04	0.02
Patient Activation Score: % Active	Y	43.70	42.62	0.02	43.67	45.22	0.03
Patient Activation Score: % Passive	Y	7.98	10.74	0.10	8.27	9.82	0.05
<i>HCC score (V22, 2015 RAS data)</i>	Y	1.15	1.33	0.19	1.30	1.21	0.10
<i>Clinical Profile<sup>‡</sup></i>							
General health now compared to one year ago: % much better	Y	5.85	10.57	0.19	7.75	8.27	0.02
General health now compared to one year ago: % somewhat better	Y	12.34	17.62	0.16	13.44	16.54	0.09
General health now compared to one year ago: % about the same	Y	61.30	52.52	0.18	58.66	55.30	0.07
General health now compared to one year ago: % somewhat worse	Y	17.04	15.94	0.03	16.80	17.57	0.02

Characteristics	Included in Matching Model	Pre-Matching			Post-Matching		
		CG*	IG*	SMD*	CG*	IG*	SMD*
General health now compared to one year ago: % much worse	Y	2.35	2.52	0.01	2.84	2.07	0.05
Physical Component Summary	Y	43.23	41.93	0.13	41.44	42.05	0.06
Mental Component Summary	Y	51.50	49.94	0.15	51.31	50.31	0.09
% Pre-diabetes †	Y	11.04	8.72	0.08	9.82	8.79	0.04
% Diabetes †	Y	30.72	47.99	0.37	45.74	44.96	0.02
% Underweight – BMI < 18.5	N	1.60	1.51	0.01	0.52	1.55	0.10
% Normal weight – 18.5 < BMI < 25	N	24.91	19.46	0.13	18.86	20.67	0.05
% Overweight – 25 < BMI < 30	Y	37.25	31.04	0.13	35.92	34.37	0.03
% Obese – BMI > 30	Y	32.66	41.61	0.19	41.09	38.24	0.06
% Rheumatoid Arthritis	Y	1.01	2.68	0.15	1.55	2.07	0.04
% Congestive Heart Failure	Y	3.77	4.87	0.06	4.39	4.13	0.01
% Specified Heart Arrhythmias	Y	5.18	4.03	0.05	5.68	4.39	0.06
% Vascular Disease	Y	3.54	4.36	0.04	4.13	3.36	0.04
% Chronic Obstructive Pulmonary Disease	Y	4.18	4.03	0.01	4.13	3.88	0.01
Charlson Comorbidity Score	Y	0.17	0.17	0.01	0.18	0.13	0.06
<b>Seasonal Variation in Index Date</b>							
Season based on index date: % Winter	N	25.28	20.64	0.11	25.06	22.22	0.07
Season based on index date: % Spring	Y	23.97	34.73	0.25	28.42	31.52	0.07
Season based on index date: % Summer	Y	26.47	14.60	0.28	15.25	16.28	0.03
Season based on index date: % Fall	Y	24.27	30.03	0.13	31.27	29.97	0.03

\* CG: Comparison Group; IG: Intervention Group; SMD: Standardized Mean Difference

‡ Clinical profile information for the non-FFS cohort was based on 2015 Risk Adjustment System (RAS) data and condition classifications based on the CMS-HCC model (Version 22).

† Diabetes status was determined using an algorithm combining claims data and self-reported information from surveys.

**Appendix Table E.5: Falls Prevention Pre-matched and Post-matched Summary for FFS Population**

Characteristics	Included in Matching Model	Pre-Matching			Post-Matching		
		CG*	IG*	SMD*	CG*	IG*	SMD*
<b>Number of Beneficiaries</b>		3,123	1,860		1,166	1,166	
<b>Age</b>							
% Age under 65	Y	28.75	19.19	0.22	14.58	13.89	0.02
% Age 65-69	Y	22.93	22.80	0.00	22.38	22.38	0.00
% Age 70-74	Y	21.23	11.45	0.26	24.70	24.27	0.01
% Age 75-79	Y	27.09	46.56	0.42	38.34	39.45	0.02
<b>% Dual Eligible</b>	Y	8.01	8.98	0.04	8.75	8.92	0.01
<b>% Married</b>	N	55.14	39.25	0.32	44.60	47.17	0.05
<b>Area Deprivation Index</b>	Y	98.59	99.44	0.05	99.32	99.46	0.01
<b>Annual Household Income</b>							
% less than \$11,670	Y	6.05	7.42	0.06	7.12	7.55	0.02
% \$11,671-\$15,730	Y	5.86	5.54	0.01	5.92	5.92	0.00
% \$15,731-\$19,999	Y	5.03	5.22	0.01	4.72	4.89	0.01
% \$20,000-\$29,999	Y	11.94	10.05	0.06	10.89	10.29	0.02
% \$30,000-\$39,999	Y	10.85	8.49	0.08	9.09	9.26	0.01
% \$40,000-\$49,999	Y	9.22	7.15	0.07	8.49	8.23	0.01
% \$50,000-\$79,999	Y	15.59	12.20	0.10	13.89	13.64	0.01
% \$80,000-\$99,999	Y	5.80	4.78	0.04	5.23	5.06	0.01
% \$100,000 or more	Y	9.19	4.57	0.18	6.17	5.83	0.01
<b>Education</b>							
% Less than high school	Y	11.46	4.95	0.23	5.92	6.52	0.02
% High school/GED	Y	30.26	27.47	0.06	29.50	29.50	0.00
% Some College	N	26.51	25.22	0.03	28.39	27.79	0.01
% College or more	Y	28.82	33.49	0.10	32.76	33.53	0.02
<b>Resource Utilization</b>							
1 IP Stay: % 1	Y	12.74	11.34	0.04	11.66	11.06	0.02
1 IP Stay: % 2+	Y	5.48	3.82	0.08	4.03	3.95	0.00
E&M Visits: % 0	Y	4.23	2.10	0.12	3.09	2.83	0.02
E&M Visits: % 1-5	Y	30.84	29.62	0.03	30.10	29.50	0.01
E&M Visits: % 6-10	Y	18.03	19.68	0.04	18.95	19.30	0.01
E&M Visits: % 11-15	Y	19.02	19.52	0.01	19.04	18.78	0.01
E&M Visits: % 16+	Y	16.52	19.68	0.08	17.75	18.78	0.03
ER Visits: % 1	Y	8.58	8.87	0.01	7.55	8.49	0.03
ER Visits: % 2+	Y	12.74	11.34	0.04	11.66	11.06	0.02
<b>Expenditures</b>							
IP Cost	Y	2,248	1,438	0.12	1,512	1,558	0.01

Characteristics	Included in Matching Model	Pre-Matching			Post-Matching		
		CG*	IG*	SMD*	CG*	IG*	SMD*
Total Cost	Y	7,971	6,614	0.10	6,661	6,651	0.00
Part D cost	N	3,203	3,011	0.02	2,797	2,964	0.03
<b>Drug Utilization</b>							
% Cardiotonics	N	8.32	4.89	0.13	5.24	6.02	0.03
% Antipsychotics	N	4.23	3.73	0.03	3.78	4.30	0.03
% SSRIs and SNRIs	N	24.24	26.40	0.05	26.22	25.68	0.01
% Antidiabetics	N	22.05	13.98	0.21	17.68	15.72	0.05
% Statin	N	61.45	58.31	0.06	59.39	60.32	0.02
<b>Health Behavior</b>							
% Low Adherence	Y	21.29	22.53	0.03	22.47	23.07	0.01
% Moderate Adherence	Y	22.48	18.87	0.09	19.47	20.24	0.02
% High Adherence	N	47.07	47.20	0.00	48.28	47.34	0.02
Patient Activation Score: % High	Y	34.26	38.12	0.08	36.28	38.16	0.04
Patient Activation Score: % Complacent	Y	5.51	6.51	0.04	6.00	5.66	0.01
Patient Activation Score: % Active	Y	46.40	42.47	0.08	45.45	44.00	0.03
Patient Activation Score: % Passive	Y	7.01	7.53	0.02	6.95	7.55	0.02
<b>HCC score (V22, 2015 RAS data)</b>	Y	1.11	1.13	0.02	1.10	1.12	0.01
<b>Clinical Profile<sup>+</sup></b>							
General health now compared to one year ago: % much better	Y	5.83	7.69	0.08	6.86	7.12	0.01
General health now compared to one year ago: % somewhat better	Y	12.84	12.74	0.00	12.52	13.04	0.02
General health now compared to one year ago: % about the same	Y	59.14	57.42	0.03	58.40	58.58	0.00
General health now compared to one year ago: % somewhat worse	Y	18.28	20.38	0.05	20.41	19.47	0.02
General health now compared to one year ago: % much worse	Y	2.72	1.34	0.09	1.46	1.37	0.01
Physical Component Summary	Y	41.67	42.07	0.04	42.12	42.09	0.00
Mental Component Summary	Y	50.96	51.86	0.09	51.79	51.66	0.01
% No problems with balance or walking in past 6 months	Y	54.02	35.11	0.39	43.22	41.42	0.04
% Underweight – BMI < 18.5	N	1.95	1.72	0.02	2.49	1.37	0.08
% Normal weight – 18.5 < BMI < 25	N	27.83	33.49	0.12	29.67	29.50	0.00
% Overweight – 25 < BMI < 30	Y	35.13	32.63	0.05	34.39	34.31	0.00
% Obese – BMI > 30	Y	32.02	28.17	0.08	30.70	30.96	0.01
% Cataract	Y	44.80	52.74	0.16	49.74	49.23	0.01
% Retinal detachments; defects; vascular occlusion; and retinopathy	Y	23.09	29.14	0.14	26.42	25.81	0.01
% Blindness and vision defects	Y	16.65	26.67	0.25	22.04	22.38	0.01
% Other eye disorders	Y	34.29	43.12	0.18	37.65	39.19	0.03

Characteristics	Included in Matching Model	Pre-Matching			Post-Matching		
		CG*	IG*	SMD*	CG*	IG*	SMD*
% Essential hypertension	Y	75.25	75.16	0.00	74.01	75.56	0.04
% Diseases of the heart	Y	48.80	50.32	0.03	46.91	48.89	0.04
% Coronary atherosclerosis and other heart disease	Y	25.84	22.10	0.09	20.58	22.04	0.04
% Circulatory or heart condition	Y	24.14	23.66	0.01	23.16	23.76	0.01
% Cardiac Dysrhythmias/arrest/ventricular fibrillation	Y	29.81	33.23	0.07	30.02	31.39	0.03
% Spondylosis; Intervertebral disc disorders; other back problems	Y	38.58	43.76	0.11	41.94	40.91	0.02
% Syncope	Y	5.00	8.12	0.13	5.66	6.60	0.04
Charlson Comorbidity Score	Y	25.62	13.71	0.13	15.69	15.44	0.00
<b>Seasonal Variation in Index Date</b>							
Season based on index date: % Winter	N	25.26	20.11	0.12	22.38	21.10	0.03
Season based on index date: % Spring	Y	25.39	32.10	0.15	28.73	29.93	0.03
Season based on index date: % Summer	Y	26.35	17.04	0.22	19.90	19.81	0.00
Season based on index date: % Fall	Y	22.99	30.75	0.18	28.99	29.16	0.00

\* CG: Comparison Group; IG: Intervention Group; SMD: Standardized Mean Difference

+ FFS service utilization, expenditure, and clinical profile information is based on diagnosis and procedure codes from Medicare claims (for service dates one year prior to the index date) available in the Common Working File (CWF), grouped in condition categories according to the Clinical Classifications Software (CCS), which was developed as part of The Healthcare Cost and Utilization Project (HCUP).

‡ Diabetes status was determined using an algorithm combining claims data and self-reported information from surveys.

**Appendix Table E.6: Falls Prevention Pre-matched and Post-matched Summary for Non-FFS Population**

Characteristics	Included in Matching Model	Pre-Matching			Post-Matching		
		CG*	IG*	SMD*	CG*	IG*	SMD*
<b>Number of Beneficiaries</b>		1,923	1,446		847	847	
<b>% Dual Eligible</b>	Y	11.54	10.17	0.04	10.86	11.69	0.03
<b>% Married</b>	N	52.26	41.56	0.22	44.27	51.24	0.14
<b>Area Deprivation Index</b>	Y	98.35	99.87	0.09	99.03	99.13	0.01
<b>Annual Household Income</b>							
% less than \$11,670	Y	8.68	9.34	0.02	9.68	9.92	0.01
% \$11,671-\$15,730	Y	7.90	7.95	0.00	7.79	7.91	0.00
% \$15,731-\$19,999	Y	7.49	6.92	0.02	8.50	6.97	0.06
% \$20,000-\$29,999	Y	13.36	12.86	0.01	12.28	12.63	0.01
% \$30,000-\$39,999	Y	11.13	9.75	0.04	11.22	10.86	0.01
% \$40,000-\$49,999	Y	9.20	7.81	0.05	8.85	8.38	0.02
% \$50,000-\$79,999	Y	13.36	8.37	0.16	9.56	10.04	0.02
% \$80,000-\$99,999	Y	3.59	3.67	0.00	4.37	4.01	0.02
% \$100,000 or more	Y	5.30	3.11	0.11	3.66	3.19	0.03
<b>Education</b>							
% Less than high school	Y	15.55	8.58	0.21	9.92	10.98	0.03
% High school/GED	Y	31.88	28.22	0.08	32.35	30.81	0.03
% Some College	Y	26.83	26.28	0.01	28.57	28.22	0.01
% College or more	N	21.74	27.52	0.14	25.50	27.51	0.05
<b>Health Behavior</b>							
% Low Adherence	Y	20.33	19.85	0.01	17.71	19.83	0.05
% Moderate Adherence	Y	21.01	20.12	0.02	22.20	20.31	0.05
% High Adherence	N	48.00	46.61	0.03	49.00	48.29	0.01
Patient Activation Score: % High	Y	31.98	36.51	0.10	35.06	34.71	0.01
Patient Activation Score: % Complacent	Y	8.06	7.12	0.04	7.79	7.67	0.00
Patient Activation Score: % Active	Y	43.73	39.83	0.08	42.03	43.57	0.03
Patient Activation Score: % Passive	Y	8.42	9.41	0.03	7.67	8.97	0.05
<b>HCC score (V22, 2015 RAS data)</b>	Y	1.19	1.17	0.02	1.18	1.16	0.02
<b>Clinical Profile<sup>‡</sup></b>							
General health now compared to one year ago: % much better	Y	6.29	6.92	0.03	7.08	6.61	0.02
General health now compared to one year ago: % somewhat better	Y	13.00	14.25	0.04	13.58	14.76	0.03
General health now compared to one year ago: % about the same	Y	59.44	54.50	0.10	56.79	58.56	0.04
General health now compared to one year ago: % somewhat worse	Y	17.89	22.27	0.11	19.83	18.30	0.04

Characteristics	Included in Matching Model	Pre-Matching			Post-Matching		
		CG*	IG*	SMD*	CG*	IG*	SMD*
General health now compared to one year ago: % much worse	Y	2.18	1.59	0.04	2.48	1.65	0.06
Physical Component Summary	Y	42.82	42.90	0.01	43.17	42.87	0.03
Mental Component Summary	Y	51.07	51.49	0.04	51.31	51.40	0.01
% No problems with balance or walking in past 6 months	Y	57.98	38.66	0.39	46.75	46.64	0.00
% Doctor suggested improvement in balance	N	24.25	36.28	0.27	28.22	33.42	0.11
ABC: Confidence in balance	N	61.56	50.58	0.38	55.51	53.52	0.07
% Pre-diabetes †	Y	11.80	10.58	0.04	11.69	10.86	0.03
% Diabetes †	Y	31.25	19.57	0.27	23.02	23.49	0.01
% Cardio-respiratory Failure and Shock	Y	1.19	1.17	0.02	1.18	1.16	0.02
% Congestive Heart failure	Y	2.08	1.11	0.08	2.13	1.30	0.06
% Specified Heart Arrhythmias	Y	4.21	3.60	0.03	4.13	3.54	0.03
% Vascular Disease	Y	5.56	5.60	0.00	5.08	4.84	0.01
% Chronic Obstructive Pulmonary Disease	Y	3.95	2.77	0.07	3.31	3.19	0.01
% Acute Renal Failure	Y	4.11	2.49	0.09	3.78	3.19	0.03
% Underweight – BMI < 18.5	N	1.77	1.45	0.02	2.13	1.53	0.04
% Normal weight – 18.5 < BMI < 25	N	25.64	31.33	0.13	28.93	28.10	0.02
% Overweight – 25 < BMI < 30	Y	35.99	34.85	0.02	35.77	36.13	0.01
% Obese – BMI > 30	Y	33.39	28.63	0.10	29.99	31.17	0.03
Charlson Comorbidity Score	Y	0.18	0.09	0.12	0.12	0.11	0.00
<b>Seasonal Variation in Index Date</b>							
Season based on index date: % Winter	N	23.76	17.29	0.16	20.54	19.01	0.04
Season based on index date: % Spring	Y	23.92	35.34	0.25	28.45	29.04	0.01
Season based on index date: % Summer	Y	26.78	18.67	0.19	22.08	22.55	0.01
Season based on index date: % Fall	Y	25.53	28.70	0.07	28.93	29.40	0.01

\* CG: Comparison Group; IG: Intervention Group; SMD: Standardized Mean Difference

‡ Clinical profile information for the non-FFS cohort was based on 2015 Risk Adjustment System (RAS) data and condition classifications based on the CMS-HCC model (Version 22).

† Diabetes status was determined using an algorithm combining claims data and self-reported information from surveys.

**Appendix Table E.7: Physical Activity, Nutrition, and Obesity Pre-matched and Post-matched Summary for FFS Population**

Characteristics	Included in Matching Model	Pre-Matching			Post-Matching		
		CG*	IG*	SMD*	CG*	IG*	SMD*
<i>Number of Beneficiaries</i>		4,285	945		595	595	
% Dual Eligible	Y	8.00	6.56	0.05	6.55	4.03	0.11
% Married	N	57.95	40.95	0.34	47.39	46.55	0.02
<i>Area Deprivation Index</i>	Y	98.62	99.23	0.03	100.53	99.25	0.09
<i>Annual Household Income</i>							
% less than \$11,670	Y	5.97	5.08	0.04	5.88	4.37	0.07
% \$11,671-\$15,730	Y	5.76	4.76	0.04	6.72	4.71	0.09
% \$15,731-\$19,999	Y	5.02	5.40	0.02	4.87	5.38	0.02
% \$20,000-\$29,999	Y	11.53	9.84	0.05	12.10	10.08	0.06
% \$30,000-\$39,999	Y	10.85	7.41	0.11	7.23	7.90	0.03
% \$40,000-\$49,999	Y	9.12	9.42	0.01	10.42	10.76	0.01
% \$50,000-\$79,999	Y	15.57	15.03	0.01	16.47	17.14	0.02
% \$80,000-\$99,999	Y	6.07	3.81	0.10	4.87	5.21	0.02
% \$100,000 or more	Y	9.80	4.66	0.18	4.71	6.05	0.06
<i>Education</i>							
% Less than high school	Y	11.30	8.47	0.09	9.58	6.72	0.10
% High school/GED	Y	30.53	23.28	0.16	23.87	24.87	0.02
% Some College	Y	26.25	31.75	0.12	31.26	31.93	0.01
% College or more	N	29.33	30.16	0.02	30.92	33.11	0.05
<i>Resource Utilization</i>							
1 IP Stay: % 1	Y	11.34	7.30	0.13	6.55	7.39	0.03
1 IP Stay: % 2+	Y	4.69	2.75	0.10	4.20	3.70	0.03
E&M Visits: % 0	Y	5.11	4.23	0.04	4.87	5.04	0.01
E&M Visits: % 1-5	Y	33.16	32.70	0.01	32.44	33.45	0.02
E&M Visits: % 6-10	N	16.99	15.34	0.04	14.96	15.97	0.03
E&M Visits: % 11-15	Y	16.78	11.01	0.16	11.09	12.44	0.04
E&M Visits: % 16+	Y	15.57	14.07	0.04	16.30	14.12	0.06
ER Visits: % 1	Y	7.21	5.19	0.08	5.21	5.55	0.01
ER Visits: % 2+	Y	11.34	7.30	0.13	6.55	7.39	0.03
<i>Expenditures</i>							
IP Cost	Y	1,927.78	1,144.77	0.12	1,260.19	1,371.30	0.02
Total Cost	Y	7,141	4,859	0.17	5,315	5,364	0.00
Part D cost	N	3,093	2,735	0.04	2,660	2,501	0.02
<i>Drug Utilization</i>							
% Antiarrhythmics	N	2.29	1.49	0.06	1.92	1.83	0.01
% Vasopressors	N	9.62	5.47	0.15	6.73	6.01	0.03

Characteristics	Included in Matching Model	Pre-Matching			Post-Matching		
		CG*	IG*	SMD*	CG*	IG*	SMD*
% ARBs	N	25.33	24.21	0.03	24.28	23.50	0.02
% Antidiabetics	N	21.99	17.74	0.10	16.83	16.19	0.02
% Statins	N	62.40	58.87	0.07	56.73	57.44	0.01
<b>Health Behavior</b>							
% Non-Smokers	Y	46.39	54.39	0.16	53.11	49.58	0.07
% Low Adherence	Y	20.35	20.21	0.00	20.50	20.00	0.01
% Moderate Adherence	Y	21.54	21.48	0.00	20.50	22.02	0.04
% High Adherence	N	48.75	45.71	0.06	47.56	46.22	0.03
Patient Activation Score: % High	Y	33.44	26.56	0.15	30.76	28.40	0.05
Patient Activation Score: % Complacent	Y	5.97	8.68	0.11	6.05	7.90	0.07
Patient Activation Score: % Active	Y	46.49	48.68	0.04	47.56	50.08	0.05
Patient Activation Score: % Passive	Y	6.88	6.67	0.01	6.72	5.55	0.05
<b>HCC score (V22, 2015 RAS data)</b>	Y	1.06	0.82	0.27	0.86	0.84	0.03
<b>Clinical Profile<sup>+</sup></b>							
General health now compared to one year ago: % much better	Y	5.37	15.77	0.41	10.76	8.91	0.06
General health now compared to one year ago: % somewhat better	Y	12.30	20.63	0.24	17.65	17.48	0.00
General health now compared to one year ago: % about the same	Y	61.19	51.11	0.21	57.82	59.16	0.03
General health now compared to one year ago: % somewhat worse	Y	17.57	10.58	0.19	12.44	12.61	0.01
General health now compared to one year ago: % much worse	Y	2.45	1.16	0.09	1.18	1.34	0.02
Physical Component Summary	Y	42.42	46.20	0.36	45.07	45.38	0.03
Mental Component Summary	Y	51.70	53.76	0.21	53.02	53.25	0.03
% Pre-diabetes <sup>‡</sup>	Y	10.06	10.58	0.02	9.58	9.75	0.01
% Diabetes <sup>‡</sup>	Y	29.5	24.13	0.12	26.72	21.18	0.13
% Deficiency and other anemia	Y	20.54	16.30	0.11	16.81	16.13	0.02
% Diseases of the heart	Y	46.77	37.04	0.20	40.00	39.50	0.01
% Coronary atherosclerosis and other heart disease	Y	24.69	17.04	0.18	16.81	18.49	0.04
% Osteoporosis	Y	12.14	18.31	0.18	17.31	15.97	0.04
% Cardiac Dysrhythmias/arrest/ventricular fibrillation	Y	28.80	20.63	0.18	24.37	22.52	0.04
% Congestive heart failure; non-hypertensive	Y	10.81	5.61	0.17	5.38	5.71	0.01
% Other Circulatory Disease	Y	24.11	19.37	0.11	21.34	20.17	0.03
% Disorders of Lipid Metabolism	Y	74.49	71.01	0.08	71.60	69.92	0.04
% Essential Hypertension	Y	73.63	71.96	0.04	71.09	68.91	0.05

Characteristics	Included in Matching Model	Pre-Matching			Post-Matching		
		CG*	IG*	SMD*	CG*	IG*	SMD*
% Spondylosis; Intervertebral disc disorders; other back problems	Y	36.10	35.45	0.01	35.97	35.13	0.02
% No problems with balance or walking in past 6 months	Y	59.98	65.29	0.11	65.55	64.71	0.02
% Other nutritional, endocrine, and metabolic disorders	Y	28.91	24.87	0.09	26.89	24.54	0.05
RAPA 1: % Rare or no physical activities	Y	5.93	2.65	0.15	2.69	3.36	0.04
RAPA 1: % Light or moderate physical activities, not every week	Y	4.85	2.75	0.10	3.19	3.19	0.00
RAPA 1: % Weekly light or moderate physical activities	Y	19.95	9.10	0.28	12.94	11.09	0.06
RAPA 1: % Moderate weekly physical activities, < 30 mins or 5 days/week	Y	21.87	21.69	0.00	22.69	24.87	0.05
RAPA 1: Moderate weekly physical activities, < 20 mins or 3 days/week	Y	3.83	4.23	0.02	5.55	3.53	0.10
RAPA 1: % Moderate weekly physical activities, > 5 days/week	Y	20.96	23.92	0.07	25.38	25.04	0.01
RAPA 1: % Vigorous physical activities, > 3 days/week	Y	20.40	33.76	0.32	25.71	27.39	0.04
RAPA 2: % Strength or Flexibility	Y	25.55	22.54	0.07	28.57	24.20	0.10
RAPA 2: % Strength and Flexibility	Y	18.72	48.15	0.71	35.13	40.00	0.10
% Underweight – BMI < 18.5	N	1.59	1.27	0.03	1.85	1.34	0.04
% Normal weight – 18.5 < BMI < 25	N	26.70	29.31	0.06	27.39	29.41	0.04
% Overweight – 25 < BMI < 30	Y	37.39	38.52	0.02	37.14	39.83	0.06
% Obese – BMI > 30	Y	31.48	28.47	0.07	31.09	27.56	0.08
Charlson Comorbidity Score	Y	21.31	7.30	0.16	8.24	7.90	0.01
<b>Seasonal Variation in Index Date</b>							
Season based on index date: % Winter	N	24.97	19.89	0.12	23.03	21.68	0.03
Season based on index date: % Spring	Y	25.79	21.06	0.11	22.02	21.85	0.00
Season based on index date: % Summer	Y	26.11	13.12	0.31	19.16	15.29	0.10
Season based on index date: % Fall	Y	23.13	45.93	0.52	35.80	41.18	0.11

\* CG: Comparison Group; IG: Intervention Group; SMD: Standardized Mean Difference

+ FFS service utilization, expenditure, and clinical profile information is based on diagnosis and procedure codes from Medicare claims (for service dates one year prior to the index date) available in the Common Working File (CWF), grouped in condition categories according to the Clinical Classifications Software (CCS), which was developed as part of The Healthcare Cost and Utilization Project (HCUP).

‡ Diabetes status was determined using an algorithm combining claims data and self-reported information from surveys.

**Appendix Table E.8: Physical Activity, Nutrition, and Obesity Pre-matched and Post-matched Summary for Non-FFS Population**

Characteristics	Included in Matching Model	Pre-Matching			Post-Matching		
		CG*	IG*	SMD*	CG*	IG*	SMD*
<b>Number of Beneficiaries</b>		2,625	744		451	451	
<b>% Dual Eligible</b>	Y	10.67	8.20	0.08	12.42	7.10	0.18
<b>% Married</b>	N	54.70	41.80	0.26	41.24	49.45	0.17
<b>Area Deprivation Index</b>	Y	98.51	98.76	0.01	99.38	98.77	0.04
<b>Annual Household Income</b>							
% less than \$11,670	Y	7.77	6.99	0.03	9.98	7.54	0.09
% \$11,671-\$15,730	Y	7.54	6.45	0.04	7.54	5.76	0.07
% \$15,731-\$19,999	Y	7.24	5.91	0.05	5.99	5.76	0.01
% \$20,000-\$29,999	Y	13.33	11.69	0.05	11.97	13.97	0.06
% \$30,000-\$39,999	Y	11.35	9.01	0.08	9.31	9.98	0.02
% \$40,000-\$49,999	Y	9.68	6.99	0.09	9.09	7.98	0.04
% \$50,000-\$79,999	Y	13.83	12.90	0.03	12.42	14.41	0.06
% \$80,000-\$99,999	Y	4.15	4.03	0.01	3.33	3.99	0.04
% \$100,000 or more	Y	5.26	4.44	0.04	3.99	5.10	0.05
<b>Education</b>							
% Less than high school	Y	16.00	9.41	0.19	14.41	8.87	0.17
% High school/GED	Y	32.46	22.31	0.22	23.95	24.39	0.01
% Some College	Y	26.02	30.65	0.10	30.38	31.26	0.02
% College or more	N	21.75	30.51	0.21	25.72	31.49	0.13
<b>Health Behavior</b>							
% Non-Smokers	N	47.62	58.20	0.21	57.21	55.21	0.04
% Low Adherence	N	19.20	21.51	0.06	20.40	22.62	0.05
% Moderate Adherence	N	20.23	18.55	0.04	19.96	18.40	0.04
% High Adherence	N	50.02	44.49	0.11	44.35	43.90	0.01
Patient Activation Score: % High	Y	31.05	28.76	0.05	28.82	29.71	0.02
Patient Activation Score: % Complacent	Y	8.50	9.27	0.03	9.76	9.09	0.02
Patient Activation Score: % Active	Y	44.23	43.28	0.02	43.90	44.12	0.00
Patient Activation Score: % Passive	Y	8.04	9.14	0.04	8.20	8.43	0.01
<b>HCC score (V22, 2015 RAS data)</b>	Y	1.13	0.81	0.36	0.95	0.88	0.10
<b>Clinical Profile<sup>‡</sup></b>							
General health now compared to one year ago: % much better	Y	6.02	13.71	0.29	10.86	7.98	0.10
General health now compared to one year ago: % somewhat better	Y	12.50	22.85	0.29	19.07	16.85	0.06
General health now compared to one year ago: % about the same	Y	61.41	49.60	0.24	52.55	58.98	0.13
General health now compared to one year ago: % somewhat worse	Y	16.69	11.96	0.13	15.52	14.41	0.03

Characteristics	Included in Matching Model	Pre-Matching			Post-Matching		
		CG*	IG*	SMD*	CG*	IG*	SMD*
General health now compared to one year ago: % much worse	Y	2.25	0.67	0.12	1.33	1.11	0.02
Physical Component Summary	Y	43.40	46.98	0.36	45.96	46.09	0.01
Mental Component Summary	Y	51.69	53.83	0.22	52.47	53.03	0.06
% Pre-diabetes †	Y	11.16	11.56	0.01	13.97	10.20	0.12
% Diabetes †	Y	30.40	23.12	0.16	27.17	25.72	0.04
% Specified Heart Arrhythmias	Y	4.88	2.02	0.14	2.00	2.66	0.04
% Chronic Obstructive Pulmonary Disease	Y	3.92	0.81	0.18	1.33	0.89	0.04
% Acute Renal Failure	Y	3.12	0.94	0.14	1.33	0.89	0.04
% No Problems with balance/walking	Y	63.31	68.28	0.10	65.41	65.41	0.00
RAPA 1: % Rare or no physical activities	Y	6.40	2.15	0.19	4.43	3.10	0.07
RAPA 1: % Light or moderate physical activities, not every week	Y	4.76	3.49	0.06	3.77	4.43	0.03
RAPA 1: % Weekly light or moderate physical activities	Y	16.11	11.16	0.14	14.19	14.19	0.00
RAPA 1: % Moderate weekly physical activities, < 30 mins or 5 days/week	Y	21.49	16.53	0.12	22.17	18.85	0.08
RAPA 1: Moderate weekly physical activities, < 20 mins or 3 days/week	Y	4.46	4.70	0.01	3.99	4.66	0.03
RAPA 1: % Moderate weekly physical activities, > 5 days/week	Y	22.02	23.79	0.04	24.39	24.17	0.01
RAPA 1: % Vigorous physical activities, > 3 days/week	Y	22.32	36.02	0.32	24.61	29.05	0.10
% RAPA Strength or Flexibility	Y	25.22	23.52	0.04	26.61	24.61	0.05
% RAPA Strength and Flexibility	Y	17.83	50.40	0.79	37.03	41.46	0.09
% Underweight – BMI < 18.5	N	1.71	0.81	0.07	1.11	0.89	0.02
% Normal weight – 18.5 < BMI < 25	N	25.22	28.90	0.08	27.72	26.61	0.02
% Overweight – 25 < BMI < 30	Y	37.10	35.75	0.03	33.48	36.59	0.07
% Obese – BMI > 30	Y	32.99	30.91	0.04	34.59	33.04	0.03
Charlson Comorbidity Score	Y	0.17	0.05	0.15	0.07	0.06	0.03
<b>Seasonal Variation in Index Date</b>							
Season based on index date: % Winter	N	24.76	22.85	0.04	24.39	23.06	0.03
Season based on index date: % Spring	Y	23.89	18.55	0.13	24.17	20.84	0.08
Season based on index date: % Summer	Y	26.70	15.46	0.26	19.29	19.29	0.00
Season based on index date: % Fall	Y	24.65	43.15	0.41	32.15	36.81	0.10

\* CG: Comparison Group; IG: Intervention Group; SMD: Standardized Mean Difference

‡ Clinical profile information for the non-FFS cohort was based on 2015 Risk Adjustment System (RAS) data and condition classifications based on the CMS-HCC model (Version 22).

† Diabetes status was determined using an algorithm combining claims data and self-reported information from surveys.

## APPENDIX F– READINESS MEASURE TESTING AND VALIDATION

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Prior research has found that individuals who are in later stages of change with respect to a behavior are more likely to participate in a program designed to assist with behavior change, and more likely to benefit from the program.<sup>45</sup> The Acumen team investigated whether a measure of wellness program readiness could be constructed that incorporates both readiness for change and likelihood of program enrollment. This composite measure would provide CMS with an estimate of beneficiaries who are both willing to engage socially around health behavior change and ready to make lifestyle modifications to implement behavior change. The Acumen team also investigated whether there is value in providing estimates of stage of change and likelihood of enrollment separately from the composite measure, as policy approaches to increasing readiness for change may be different from approaches to encourage program participation among those who are ready for change.

This appendix describes the process used to develop, test, and validate a composite readiness measure. In Section F.1 we outline the available survey items for measuring readiness. In Section F.2 we show psychometric statistics for different readiness measure options. Finally, in Section F.3 we evaluate the different readiness measures and draw conclusions about their reliability and validity.

### F.1 Options for Measuring Readiness

The Acumen team explored six questions from the national baseline survey available for estimating readiness to engage in a wellness program. The first item is a direct report from respondents on their likelihood of enrolling in a wellness program in the next six months. The remaining five items were designed for the national survey based on Prochaska's<sup>46</sup> stages of behavior change. They assess behaviors relevant for the wellness programs being evaluated in this study and include: improving diet, managing weight, exercising for health, exercising for balance, and managing chronic health conditions. Following Donovan and colleagues,<sup>47</sup> each individual was classified in a stage of change for each behavior as shown in Appendix Table F.1.

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<sup>45</sup> Mak, Y., Lee, P., & Loke, A. (2015). Predictors of participation in a telephone-based Acceptance and Commitment Therapy for smoking cessation study. *BC Public Health, 15*, 1288; Marcus, B., Selby, V., Niaura, R., & Rossi, J. (1992). Self-efficacy and the stages of exercise behavior change. *Research Quarterly for Exercise and Sport, 63*, 60-66.

<sup>46</sup> Prochaska, J. & DiClemente, C. (1983). Stages and processes of self-change in smoking: towards an integrated model of change. *Journal of Consulting and Clinical Psychology, 51*, 390-395.

<sup>47</sup> Donovan, R., Jones, S., Holman, C., & Corti, B. (1998). Assessing the reliability of a stage of change scale. *Health Education Research, 13*, 285-291.

**Appendix Table F.1: Coding Survey Items to Prochaska’s Stage of Change**

Survey Response Option	Stage of Change
I am not thinking of making a change like this.	Precontemplation
I am thinking about making this kind of change, but not in the next month.	Contemplation
I am thinking about making this kind of change in the next month or sooner.	Preparation
I am currently trying to make this kind of change, or made it recently.	Action
I don’t need to make a change like this.	Tested as missing and precontemplation; ultimately coded as precontemplation <sup>48</sup>

Sources: Prochaska and DiClemente,<sup>46</sup> Donovan et al.<sup>47</sup>

## F.2 Factor Analysis and Measurement Statistics

Correlation and factor analysis were used to assess the feasibility of combining items into composite indexes for the stages of change and composite readiness estimates (Appendix Table F.2). These techniques allowed the team to determine the extent to which the items appear to measure the same underlying construct. The five stages-of-change items were highly correlated with each other; stage of change in one area of behavior change is closely aligned with stage of change in the others. Cronbach’s alpha, a measure of internal consistency reliability for the items, was 0.84, and all five items loaded strongly onto a single latent factor explaining 60.7 percent of the variance across the five items. These results are within acceptable ranges.<sup>49</sup> When the enrollment likelihood item was introduced, the analysis again yielded a single factor. The factor loading of the enrollment likelihood item was somewhat lower than loadings for the stages-of-change items, but it was still acceptably high (i.e., above 0.40).

<sup>48</sup> Note that prior research has typically been conducted among individuals who need to make a specific behavior change, while our study focuses on population estimates. Based on the pre-testing and cognitive interviews during survey development, we included the option “I don’t need to make a change like this” to capture responses for individuals for whom a specific behavior was perceived by the respondent to be irrelevant. Acknowledging that it is not possible to know whether respondents really need to make changes, and reasoning that either way respondents are not currently thinking about a change, we tested two alternatives for coding these responses to stage of change: 1) treat them as missing, or 2) code them in the precontemplation stage. Results of our analysis were similar using both coding schemes, but the number of cases treated as missing in the first coding scheme was unacceptably high (over 40%). The remainder of this memo presents results under the second coding scheme, where individuals reporting no need for change are coded as precontemplation.

<sup>49</sup> Nunnally, J. C. (1978). *Psychometric theory*, 2nd edition. New York: McGraw-Hill.

**Appendix Table F.2: Measurement Statistics**

Statistic Description	Statistic Value
Stages of Change Items (N=8,606)	
Cronbach's alpha	0.84
Factor loadings	
Improving diet	0.74
Managing weight	0.82
Exercise for health	0.84
Exercise for balance	0.74
Manage chronic condition	0.74
Percent of variance explained by factor	60.7%
Stages of Change + Enrollment likelihood (N=8,483)	
Cronbach's alpha	0.82
Factor loadings	
Improving diet	0.73
Managing weight	0.81
Exercise for health	0.83
Exercise for balance	0.74
Manage chronic condition	0.74
Likelihood of enrollment	0.50
Percent of variance explained by factor	53.7%

Source: National baseline survey of Medicare beneficiaries.

To develop the final index used in Section 3, three options for measuring readiness were considered and tested against each other:

- *Stages-of-change index*: Average stage of change score across the five health behaviors, where the average is computed for all respondents answering at least four of the five items included.
- *Likelihood of enrollment item*: Self-reported likelihood of program enrollment, with respondents missing data on the item excluded.
- *Composite readiness index*: Computed as the sum of the stage of change index and likelihood item, both assessed on a four-point scale, with respondents missing data on either component excluded.

Appendix Table F.3 shows the distribution of the three dependent variables, and Appendix Table F.4 shows correlations of independent variables with the three measures.

**Appendix Table F.3: Options for Readiness Measurement**

Statistic and Definition Descriptions	Stage of Change Index	Likelihood of Enrollment Item	Composite Readiness Index
N	8,869	8,957	8,686
Mean	2.5	1.9	4.4
Minimum	1.0	1.0	2.0
25 <sup>th</sup> percentile	1.6	1.0	3.0
Median	2.6	2.0	4.4
75 <sup>th</sup> percentile	3.4	3.0	5.8
Maximum	4.0	4.0	8.0

Statistic and Definition Descriptions	Stage of Change Index	Likelihood of Enrollment Item	Composite Readiness Index
Definition of “ready”	Preparation or Action Stage (index score of 3 and above)	Likely or very likely to enroll (3 or 4)	6 or higher
<b>Percent of respondents “ready”</b>	<b>39.43%</b>	<b>25.80%</b>	<b>24.36%</b>
90% Confidence Interval	(38.60, 40.26)	(24.97, 26.64)	(23.55, 25.17)

Note: Stage of change index ranges from 1 to 4, likelihood of enrollment item ranges from 1 to 4, and composite readiness index ranges from 2 to 8.

Source: National baseline survey of Medicare beneficiaries.

**Appendix Table F.4: Weighted Bivariate Correlations of Readiness Measures with Independent Variables (N=5,989)**

Independent Variables	Variable Mean	Correlation with Stages of Change Score	Correlation with Likelihood of Enrollment	Correlation with Composite Readiness Score
<b>Demographics</b>				
Female gender	0.58	0.08***	0.10***	0.11***
Nonwhite race	0.11	0.08***	0.12***	0.12***
Hispanic ethnicity	0.04	0.03**	0.04***	0.04***
Age	75.31	-0.20***	-0.11***	-0.19***
Self-reported dual enrollment: Medicaid	0.06	-0.01	0.01	-0.00
<b>Social engagement in health</b>				
Aware of wellness program	0.51	0.12***	0.16***	0.17***
Enrolled past 24 months in program	0.18	0.18***	0.36***	0.33***
<b>Barriers to change</b>				
Difficulty with English	0.02	-0.01	0.01	-0.02
Live alone	0.27	-0.01	0.04***	0.02
Education level	3.88	0.02**	0.07***	0.06***
Social Support	15.51	-0.04***	-0.08***	-0.07***
Transportation difficulty	0.11	-0.02	-0.02*	-0.02*
<b>Facilitators for change</b>				
Self-efficacy	31.02	0.04***	0.10***	0.09***
Patient activation	2.01	0.02	0.05***	0.04**
Physician recommendation	0.70	0.37***	0.19***	0.34***
<b>Indicators of need</b>				
BMI	27.91	0.25***	0.07***	0.20***
Chronic condition: arthritis	0.63	0.11***	0.06***	0.10***
Chronic condition: diabetes	0.23	0.14***	0.04***	0.12***
Chronic condition: pre-diabetes	0.10	0.09***	0.04***	0.08***
SF-36 Physical components summary	43.29	-0.08***	-0.00	-0.05***
SF-36 Mental components summary	52.46	-0.04***	-0.02*	-0.04***
Current smoker	0.06	-0.04***	-0.05***	-0.06***

Source: Baseline national survey of Medicare beneficiaries.

Notes: Correlation shown is Pearson’s correlation coefficient (*r*). \**p*< 0.10; \*\* *p*< 0.05; \*\*\**p*< 0.01.

### F.3 Measure Evaluation

To formally evaluate the three measures of readiness against each other, we applied commonly used criteria outlined by Nunnally<sup>49</sup>:

- Internal consistency reliability, measured by Cronbach’s alpha, is the extent to which items in an index measure the same underlying concept. A value of 0.70 or greater is generally considered strong enough evidence that there is an underlying factor.
- Measures load on a single factor in factor analysis, unless a measure is hypothesized to be multidimensional in nature. Loadings greater than 0.40 are considered evidence that an item contributes to measurement of the underlying factor.
- Construct validity, an indication of how well an index measures the construct it was designed to measure, can be established with the confirmation of known group differences in the construct. For example, predictors found in the literature operate as expected with the new index. To establish construct validity, we tested five to six regression models for each readiness measure incorporating blocks of predictor variables. With each additional block added, we observed the changes in the predictive power of the model as measured by the adjusted R<sup>2</sup>.
  - Model 1 includes demographic characteristics.
  - Model 2 adds measures of social engagement in health.
  - Model 3 adds potential barriers to change.
  - Model 4 adds potential facilitators for change.
  - Model 5 adds indicators of need and is the most complete model for the composite readiness score and the stages-of-change score.
  - Model 6 adds the stages-of-change score and is the most complete model for the likelihood of enrollment score.
- Content validity, a judgment about the extent to which the items capture the information needed to measure the construct, is typically established through expert review of the constituent items.

The composite readiness index best met the evaluation criteria and thus was selected as the final measure of wellness program readiness. The items contributing to this index achieved high internal consistency reliability and acceptable factor loadings; the measure had the highest R<sup>2</sup> in regression analysis (Appendix Table F.5, Model 5); and, from a content validity perspective, it incorporates both likelihood of program enrollment and the readiness for behavior change, which is essential for engagement in a wellness program.

**Appendix Table F.5: Linear Regression on Composite Readiness Score (N=5,989)**

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5
<b>Demographics</b>					
Female gender	0.12***	0.10***	0.09***	0.10***	0.10***
Nonwhite race	0.12***	0.10***	0.10***	0.08***	0.08***
Hispanic ethnicity	0.04***	0.04***	0.04***	0.03**	0.03**
Age	-0.18***	-0.19***	-0.18***	-0.15***	-0.14***
Self-reported Medicaid enrollment	-0.02	-0.02	-0.01	-0.01	-0.02
<b>Social engagement in health</b>					
Aware of wellness program		0.09***	0.09***	0.06***	0.06***

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Enrolled past 24 months in program		0.29***	0.29***	0.26***	0.26***
<b>Barriers to change</b>					
Difficulty with English			-0.01	-0.01	-0.00
Live alone			-0.00	-0.00	0.00
Education Level					
Less than high school (reference)					
High school graduate			0.06***	0.06***	0.07***
Some college			0.10***	0.10***	0.12***
College graduate			0.06***	0.07***	0.10***
Social Support			-0.06***	-0.05***	-0.05***
Transportation difficulty			0.00	-0.00	-0.03*
<b>Facilitators for change</b>					
Self-efficacy				0.06***	0.13***
Patient activation				0.01	0.00
Physician recommendation				0.30***	0.26***
<b>Indicators of need</b>					
BMI					0.10***
Chronic condition: arthritis					0.03***
Chronic condition: diabetes					0.03***
Chronic condition: pre-diabetes					0.05***
SF-36 Physical components					-0.06***
SF-36 Mental components					-0.07***
Current smoker					-0.04***
<i>Adjusted R<sup>2</sup></i>	0.06***	0.17***	0.18***	0.27***	0.29***

Source: Baseline national survey of Medicare beneficiaries.

Notes: Values shown are standardized parameter estimates. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

The stages-of-change index is an excellent measure of readiness for behavior change, but it does not incorporate the social engagement in health aspect that is required for program participation. This index achieved the highest internal consistency reliability and factor loadings; items in this index are very highly interrelated and load strongly on a single factor. There is substantial evidence for construct validity as well, as predictors were generally related in expected ways to the index (Appendix Table F.6).

**Appendix Table F.6: Linear Regressions on Stages-of-Change Score (N=5,989)**

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5
<b>Demographics</b>					
Female gender	0.09***	0.08***	0.07***	0.09***	0.08***
Nonwhite race	0.07***	0.07***	0.07***	0.04***	0.04***
Hispanic ethnicity	0.03**	0.03**	0.03**	0.01	0.01
Age	-0.20***	-0.20***	-0.20***	-0.17***	-0.16***
Self-reported enrollment: Medicaid	-0.02*	-0.02	-0.02	-0.02	-0.03**
<b>Social engagement in health</b>					
Aware of wellness program		0.08***	0.08***	0.05***	0.05***
Enrolled past 24 months in program		0.15***	0.15***	0.12***	0.12***
<b>Barriers to change</b>					
Difficulty with English			-0.01	-0.02	-0.01
Live alone			-0.01	-0.01	0.00
Education Level					

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Less than high school (reference)					
High school graduate			0.04*	0.04**	0.05***
Some college			0.06***	0.07***	0.08***
College graduate			0.01	0.03	0.06***
Social Support			-0.04***	-0.04***	-0.03**
Transportation difficulty			0.02*	0.00	-0.02
<b>Facilitators for change</b>					
Self-efficacy				0.03*	0.10***
Patient activation				0.00	-0.01
Physician recommendation				0.35***	0.29***
<b>Indicators of need</b>					
BMI					0.14***
Chronic condition: arthritis					0.04***
Chronic condition: diabetes					0.05***
Chronic condition: pre-diabetes					0.06***
SF-36 Physical components					-0.06***
SF-36 Mental components					-0.05***
Current smoker					-0.03***
<i>Adjusted R<sup>2</sup></i>	0.05***	0.09***	0.09***	0.21***	0.25***

Source: Baseline national survey of Medicare beneficiaries.

Notes: Values shown are standardized parameter estimates. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

The likelihood of enrollment item could not be assessed in terms of internal consistency reliability or factor structure. However, the item performed reasonably well in regression models evaluating construct validity (Appendix Table F.7). The single-item nature of this measure is a weakness because has less variability for modeling, and the item does not capture information needed to understand whether respondents are ready to make behavior changes as recommended by wellness programs. From a content validity perspective, while the item measures likelihood of enrollment, it is not complete as a measure of readiness to engage in a wellness program.

**Appendix Table F.7: Linear Regression on Likelihood of Enrollment (N=5,989)**

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<b>Demographics</b>						
Female gender	0.10***	0.08***	0.08***	0.09***	0.08***	0.06***
Nonwhite race	0.11***	0.10***	0.10***	0.09***	0.09***	0.08***
Hispanic ethnicity	0.04***	0.04***	0.03***	0.04**	0.03***	0.03**
Age	-0.11***	-0.11***	-0.10***	-0.08***	-0.08***	-0.04**
Self-reported Medicaid enrollment	-0.01	-0.01	0.00	0.00	0.00	0.00
<b>Social engagement in health</b>						
Aware of wellness program		0.07***	0.07***	0.05***	0.05***	0.08**
Enrolled past 24 months in program		0.34***	0.33***	0.32***	0.31***	0.28***
<b>Barriers to change</b>						
Difficulty with English			-0.00	0.00	0.00	0.00
Live alone			0.00	0.00	0.01	0.01
Education Level						
Less than high school (reference)						

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
High school graduate			0.06***	0.06***	0.07***	0.06***
Some college			0.11***	0.11***	0.12***	0.09***
College graduate			0.09***	0.09***	0.10***	0.08***
Social Support			-0.06***	-0.06***	-0.05***	-0.04***
Transportation difficulty			-0.02	-0.01	-0.03*	-0.02
<b>Facilitators for change</b>						
Self-efficacy				0.06***	0.11***	0.08***
Patient activation				-0.01	0.01	-0.01
Physician recommendation				0.15***	0.13***	0.06***
<b>Indicators of need</b>						
BMI					0.03**	-0.01
Chronic condition: arthritis					0.02	0.01
Chronic condition: diabetes					-0.00	-0.01
Chronic condition: pre-diabetes					0.02	0.01
SF-36 Physical components					-0.04***	-0.02
SF-36 Mental components					-0.06***	-0.05***
Current smoker					-0.03***	-0.02**
<b>Stages of Change Score</b>						0.26***
<i>Adjusted R<sup>2</sup></i>	0.04***	0.17***	0.18***	0.20***	0.21***	0.26***

Source: Baseline national survey of Medicare beneficiaries.

Notes: Values shown are standardized parameter estimates. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

A further test of the composite readiness index’s construct validity was performed by comparing survey responses of individuals who were already participating in wellness programs being evaluated in this study (participants) with national survey respondents who were scored as “ready to engage in a wellness program” – 6 or higher – on the composite index. For this comparison, we selected measures from each predictive domain that discriminated between those who were ready and not ready (Appendix Table F.8).

**Appendix Table F.8: Comparison of Participants to National Respondents**

Independent Variables	Wellness Program Participant Sample (N=6,999)	National Sample	
		“Ready” Respondents (N=2,175)	“Not Ready” Respondents (N=6,508)
<b>Demographics:</b> Age (Mean)	76.7	73.9	76.0
<b>Social engagement in health:</b> Participation in wellness program in past 24 months	100.0% (assumed)	36.5%	12.8%
<b>Barriers to change:</b> Education less than high school (%)	10.7%	10.9%	14.6%
<b>Facilitators for change:</b> Received physician recommendation for behavior change (%)	83.1%	86.0%	63.6%
<b>Facilitators for change:</b> Self-efficacy (Mean)	31.2	31.7	30.8
<b>Indicators of need:</b> BMI (Mean)	28.4	29.1	27.1

Source: National baseline survey of Medicare beneficiaries (National Sample). Participant baseline survey (Participant Sample).

These comparisons provide additional evidence for construct validity of the composite readiness index. The strongest predictor of readiness, receipt of a physician recommendation for behavior change, occurred for 83 percent of participants and 86 percent of “ready” national respondents, compared with only 64 percent of “not ready” national respondents. “Ready” respondents also looked similar to wellness program participants in the areas of education and participation in wellness programs over the past 24 months. Age was negatively correlated with readiness: older individuals were less ready to engage in a wellness program. However, wellness program participants have an average age closer to those who were “not ready.” This finding is likely due to the high number of participants in falls prevention programs, which have a much older average age, rather than to a deficiency in the readiness measure. BMI and self-efficacy were not significantly different between among program participants, “ready” and “not ready” respondents to the national survey.

## APPENDIX G – SINGLE DIFFERENCES FOR SURVEY-BASED OUTCOMES WITHIN THE ATT SAMPLE

This appendix presents single differences for survey-based outcomes within the *average treatment effect among the treated* (ATT) sample. Appendix Table G.1 through Appendix Table G.15 provide single differences (change over time within the treatment and comparison groups, respectively) for all outcomes within the ATT sample. Means and difference-in-difference results for all outcomes and program areas can be found in Section 4. Difference-in-difference results within the *intention to treat* (ITT) sample can be found in Appendix H.

**Appendix Table G.1: Difference in Six Month and Baseline Means for SF-36 Health Status Outcomes in Chronic Disease Management Programs**

Measures	Comparison (Six Month - Baseline)	Participants (Six Month - Baseline)
<b>Physical Components Summary Score</b>		
Number of Beneficiaries	601	525
Score Difference	-0.196	0.057
90% Confidence Interval	(-0.567,0.175)	(-0.440,0.554)
P-Value	0.383	0.850
<b>Physical Functioning Subscale</b>		
Number of Beneficiaries	601	545
Score Difference	-0.486*	0.150
90% Confidence Interval	(-0.914,-0.058)	(-0.466,0.766)
P-Value	0.062	0.689
<b>Role Physical Subscale</b>		
Number of Beneficiaries	601	524
Score Difference	-0.287	0.368
90% Confidence Interval	(-0.741,0.167)	(-0.274,1.009)
P-Value	0.298	0.345
<b>Bodily Pain Subscale</b>		
Number of Beneficiaries	611	523
Score Difference	0.400	0.410
90% Confidence Interval	(-0.114,0.915)	(-0.243,1.063)
P-Value	0.200	0.301
<b>General Health Subscale</b>		
Number of Beneficiaries	612	545
Score Difference	-0.526*	0.235
90% Confidence Interval	(-1.009,-0.043)	(-0.389,0.859)
P-Value	0.074	0.535

Notes: Includes program completers (as defined by programs) and their comparators only. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table G.2: Difference in Six Month and Baseline Means for SF-36 Mental Health Status Outcomes in Chronic Disease Management Programs**

Measures	Comparison (Six Month - Baseline)	Participants (Six Month - Baseline)
<b>Mental Components Summary Score</b>	---	
Number of Beneficiaries	601	525
Score Difference	-0.000	0.528
90% Confidence Interval	(-0.504,0.503)	(-0.222,1.279)
P-Value	0.999	0.246
<b>Vitality Subscale</b>	---	
Number of Beneficiaries	612	544
Score Difference	-0.150	-0.190
90% Confidence Interval	(-0.622,0.322)	(-0.861,0.482)
P-Value	0.600	0.641
<b>Social Functioning Subscale</b>	---	
Number of Beneficiaries	612	544
Score Difference	0.506	-0.186
90% Confidence Interval	(-0.026,1.038)	(-1.053,0.681)
P-Value	0.118	0.723
<b>Role Emotional Subscale</b>	---	
Number of Beneficiaries	597	523
Score Difference	-0.319	0.845
90% Confidence Interval	(-0.992,0.354)	(-0.028,1.719)
P-Value	0.434	0.111
<b>Mental Health Subscale</b>	---	
Number of Beneficiaries	612	544
Score Difference	-0.284	1.008**
90% Confidence Interval	(-0.773,0.205)	(0.355,1.661)
P-Value	0.339	0.012

Notes: Includes program completers (as defined by programs) and their comparators only. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table G.3: Difference in Six Month and Baseline Means for Rapid Assessment of Physical Activity (RAPA) Scale in Chronic Disease Management Programs**

Measures	Comparison (Six Month - Baseline)	Participants (Six Month - Baseline)
<b>RAPA – Aerobic Activity</b>		
Number of Beneficiaries	583	533
Score Difference	-0.101	-0.161
90% Confidence Interval	(-0.228,0.027)	(-0.333,0.011)
P-Value	0.193	0.125
<b>RAPA – Strength and Flexibility</b>		
Number of Beneficiaries	568	506
Score Difference	-0.003	0.001
90% Confidence Interval	(-0.038,0.031)	(-0.044,0.047)
P-Value	0.881	0.962

Notes: Includes program completers (as defined by programs) and their comparators only. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table G.4: Difference in Six Month and Baseline Means for Falls and Balance Outcomes in Chronic Disease Management Programs**

Measures	Comparison (Six Month - Baseline)	Participants (Six Month - Baseline)
<b>Presence of Falls in Last Six Months</b>		
Number of Beneficiaries	559	488
Score Difference	0.013	0.014
90% Confidence Interval	(-0.016,0.042)	(-0.024,0.052)
P-Value	0.450	0.545
<b>Confidence in Balance (ABC) Scale</b>		
Number of Beneficiaries	397	362
Score Difference	-2.390***	0.728
90% Confidence Interval	(-3.806,-0.974)	(-1.371,2.827)
P-Value	0.006	0.567

Notes: Includes program completers (as defined by programs) and their comparators only. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table G.5: Difference in Six Month and Baseline Means for Self-Reported Medication Adherence in Chronic Disease Management Programs**

Measures	Comparison (Six Month - Baseline)	Participants (Six Month - Baseline)
<b>Medication Adherence (MAQ-4)</b>		
Number of Beneficiaries	541	483
Score Difference	0.127***	0.070
90% Confidence Interval	(0.067,0.188)	(-0.039,0.179)
P-Value	0.001	0.291

Notes: Includes program completers (as defined by programs) and their comparators only. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table G.6: Difference in Six Month and Baseline Means for SF-36 Health Status Outcomes in Physical Activity, Nutrition, and Obesity Programs**

Measures	Comparison (Six Month - Baseline)	Participants (Six Month - Baseline)
<b>Physical Components Summary Score</b>		
Number of Beneficiaries	592	538
Score Difference	-0.513**	-0.275
90% Confidence Interval	(-0.906,-0.119)	(-0.754,0.204)
P-Value	0.033	0.343
<b>Physical Functioning Subscale</b>		
Number of Beneficiaries	595	557
Score Difference	-0.645**	-0.371
90% Confidence Interval	(-1.086,-0.205)	(-0.899,0.157)
P-Value	0.016	0.247
<b>Role Physical Subscale</b>		
Number of Beneficiaries	595	538
Score Difference	-0.521*	0.004
90% Confidence Interval	(-0.961,-0.081)	(-0.573,0.580)
P-Value	0.052	0.991
<b>Bodily Pain Subscale</b>		
Number of Beneficiaries	602	537
Score Difference	-0.116	0.485
90% Confidence Interval	(-0.646,0.415)	(-0.243,1.212)
P-Value	0.719	0.273
<b>General Health Subscale</b>		
Number of Beneficiaries	607	557
Score Difference	-0.433*	-0.613*
90% Confidence Interval	(-0.823,-0.043)	(-1.174,-0.052)
P-Value	0.068	0.072

Notes: Includes program completers (as defined by programs) and their comparators only. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table G.7: Difference in Six Month and Baseline Means for SF-36 Mental Health Status Outcomes in Physical Activity, Nutrition, and Obesity Programs**

Measures	Comparison (Six Month - Baseline)	Participants (Six Month - Baseline)
<b>Mental Components Summary Score</b>		
Number of Beneficiaries	592	538
Score Difference	-0.489	0.289
90% Confidence Interval	(-1.040,0.061)	(-0.324,0.901)
P-Value	0.144	0.437
<b>Vitality Subscale</b>		
Number of Beneficiaries	604	557
Score Difference	-0.882	-0.537
90% Confidence Interval	(-1.354,-0.409)	(-1.033,-0.041)
P-Value	0.002	0.075
<b>Social Functioning Subscale</b>		
Number of Beneficiaries	604	556
Score Difference	-1.064***	0.168
90% Confidence Interval	(-1.615,-0.513)	(-0.495,0.831)
P-Value	0.002	0.676
<b>Role Emotional Subscale</b>		
Number of Beneficiaries	595	536
Score Difference	-0.294	0.656*
90% Confidence Interval	(-0.916,0.329)	(0.022,1.290)
P-Value	0.437	0.089
<b>Mental Health Subscale</b>		
Number of Beneficiaries	604	557
Score Difference	-0.213	-0.050
90% Confidence Interval	(-0.697,0.270)	(-0.604,0.505)
P-Value	0.467	0.882

Notes: Includes program completers (as defined by programs) and their comparators only. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table G.8: Difference in Six Month and Baseline Means for Rapid Assessment of Physical Activity (RAPA) Scale in Physical Activity, Nutrition, and Obesity Programs**

Measures	Comparison (Six Month - Baseline)	Participants (Six Month - Baseline)
<b>RAPA – Aerobic Activity</b>		
Number of Beneficiaries	588	549
Score Difference	-0.225***	0.176**
90% Confidence Interval	(-0.324,-0.127)	(0.052,0.301)
P-Value	0.000	0.020
<b>RAPA – Strength and Flexibility</b>		
Number of Beneficiaries	569	509
Score Difference	-0.075***	0.074***
90% Confidence Interval	(-0.108,-0.042)	(0.034,0.114)
P-Value	0.000	0.002

Notes: Includes program completers (as defined by programs) and their comparators only. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table G.9: Difference in Six Month and Baseline Means for Falls and Balance Outcomes in Physical Activity, Nutrition, and Obesity Programs**

Measures	Comparison (Six Month - Baseline)	Participants (Six Month - Baseline)
<b>Presence of Falls in Last Six Months</b>		
Number of Beneficiaries	574	517
Score Difference	0.015	0.004
90% Confidence Interval	(-0.016,0.045)	(-0.024,0.033)
P-Value	0.437	0.805
<b>Confidence in Balance (ABC) Scale</b>		
Number of Beneficiaries	399	394
Score Difference	-2.018**	-0.599
90% Confidence Interval	(-3.485,-0.551)	(-2.407,1.208)
P-Value	0.024	0.584

Notes: Includes program completers (as defined by programs) and their comparators only. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table G.10: Difference in Six Month and Baseline Means for Self-Reported Medication Adherence in Physical Activity, Nutrition, and Obesity Programs**

Measures	Comparison (Six Month - Baseline)	Participants (Six Month - Baseline)
<b>Medication Adherence (MAQ-4)</b>		
Number of Beneficiaries	503	462
Score Difference	0.109***	0.023
90% Confidence Interval	(0.041,0.176)	(-0.056,0.102)
P-Value	0.008	0.632

Notes: Includes program completers (as defined by programs) and their comparators only. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table G.11: Difference in Six Month and Baseline Means for SF-36 Health Status Outcomes in Falls Prevention Programs**

Measures	Comparison (Six Month - Baseline)	Participants (Six Month - Baseline)
<b>Physical Components Summary Score</b>		
Number of Beneficiaries	1358	1236
Score Difference	-0.539***	-0.643***
90% Confidence Interval	(-0.825,-0.254)	(-0.972,-0.313)
P-Value	0.002	0.002
<b>Physical Functioning Subscale</b>		
Number of Beneficiaries	1366	1287
Score Difference	-0.767***	-0.629***
90% Confidence Interval	(-1.068,-0.466)	(-0.967,-0.291)
P-Value	<.0001	0.002
<b>Role Physical Subscale</b>		
Number of Beneficiaries	1365	1236
Score Difference	-0.621***	0.164
90% Confidence Interval	(-0.974,-0.268)	(-0.238,0.567)
P-Value	0.004	0.501
<b>Bodily Pain Subscale</b>		
Number of Beneficiaries	1383	1237
Score Difference	-0.104	0.250
90% Confidence Interval	(-0.479,0.271)	(-0.146,0.647)
P-Value	0.646	0.298
<b>General Health Subscale</b>		
Number of Beneficiaries	1396	1285
Score Difference	-0.283*	-0.540***
90% Confidence Interval	(-0.548,-0.018)	(-0.843,-0.237)
P-Value	0.079	0.004

Notes: Includes program completers (as defined by programs) and their comparators only. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table G.12: Difference in Six Month and Baseline Means for SF-36 Mental Health Status Outcomes in Falls Prevention Programs**

Measures	Comparison (Six Month - Baseline)	Participants (Six Month - Baseline)
<b>Mental Components Summary Score</b>		
Number of Beneficiaries	1358	1236
Score Difference	-0.040	1.078***
90% Confidence Interval	(-0.433,0.354)	(0.668,1.488)
P-Value	0.868	<.0001
<b>Vitality Subscale</b>		
Number of Beneficiaries	1388	1285
Score Difference	-0.218	-0.160
90% Confidence Interval	(-0.539,0.103)	(-0.528,0.208)
P-Value	0.264	0.474
<b>Social Functioning Subscale</b>		
Number of Beneficiaries	1387	1282
Score Difference	-0.153	0.528*
90% Confidence Interval	(-0.605,0.299)	(0.083,0.972)
P-Value	0.577	0.051
<b>Role Emotional Subscale</b>		
Number of Beneficiaries	1360	1225
Score Difference	-0.586**	1.198***
90% Confidence Interval	(-1.042,-0.130)	(0.696,1.699)
P-Value	0.035	0.000
<b>Mental Health Subscale</b>		
Number of Beneficiaries	1388	1286
Score Difference	-0.004	0.656***
90% Confidence Interval	(-0.358,0.351)	(0.325,0.987)
P-Value	0.986	0.001

Notes: Includes program completers (as defined by programs) and their comparators only. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table G.13: Difference in Six Month and Baseline Means for Rapid Assessment of Physical Activity (RAPA) Scale in Falls Prevention Programs**

Measures	Comparison (Six Month - Baseline)	Participants (Six Month - Baseline)
<b>RAPA – Aerobic Activity</b>		
Number of Beneficiaries	1329	1261
Score Difference	0.073	-0.209***
90% Confidence Interval	(-0.014,0.161)	(-0.300,-0.118)
P-Value	0.168	0.000
<b>RAPA – Strength and Flexibility</b>		
Number of Beneficiaries	1262	1184
Score Difference	0.019	0.047***
90% Confidence Interval	(-0.004,0.043)	(0.025,0.069)
P-Value	0.173	0.000

Notes: Includes program completers (as defined by programs) and their comparators only. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table G.14: Difference in Six Month and Baseline Means for Falls and Balance Outcomes in Falls Prevention Programs**

Measures	Comparison (Six Month - Baseline)	Participants (Six Month - Baseline)
<b>Presence of Falls in Last Six Months</b>		
Number of Beneficiaries	1269	1173
Score Difference	-0.068***	-0.042***
90% Confidence Interval	(-0.094,-0.042)	(-0.067,-0.017)
P-Value	<.0001	0.006
<b>Confidence in Balance (ABC) Scale</b>		
Number of Beneficiaries	947	939
Score Difference	-1.530**	1.092
90% Confidence Interval	(-2.672,-0.388)	(-0.162,2.346)
P-Value	0.028	0.152

Notes: Includes program completers (as defined by programs) and their comparators only. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table G.15: Difference in Six Month and Baseline Means for Self-Reported Medication Adherence in Falls Prevention Programs**

Measures	Comparison (Six Month - Baseline)	Participants (Six Month - Baseline)
<b>Medication Adherence (MAQ-4)</b>		
Number of Beneficiaries	1222	1098
Score Difference	0.027	0.048
90% Confidence Interval	(-0.014,0.068)	(-0.005,0.100)
P-Value	0.275	0.133

Notes: Includes program completers (as defined by programs) and their comparators only. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

## APPENDIX H – INTENTION TO TREAT ANALYSIS TABLES

Appendix H provides statistics from the Intention to Treat (ITT) difference-in-difference analysis, which includes all participants and their matches. Appendix Table H.1 highlights demographic differences between non-completers and others,<sup>50</sup> and Appendix Table H.2 through Appendix Table H.6 present difference-in-difference estimates from the ITT analysis.

**Appendix Table H.1: Baseline Characteristics of Program Non-Completers vs. Other Participants**

Characteristics	CDM		PANO		FP	
	Non-Completers	All Others	Non-Completers	All Others	Non-Completers	All Others
	N=144	N=766	N=298	N=742	N=289	N=1,712
<b>Average Age<sup>a</sup></b>	75.3	75.1	74.0	75.3***	79.0	78.4
<b>% Female<sup>a</sup></b>	77.4	79.4	86.4	77.3***	79.8	78.8
<b>Race/ethnicity<sup>b</sup></b>						
%White	84.0	73.7	75.3	83.3**	92.8	92.0
%Black/ African American	14.5	25.1	21.7	13.1**	5.3	5.4
%Asian	0.8	0.4	1.5	2.2**	0.8	0.7
%American Indian/ Alaska Native	0.0	0.3	0.8	0.6**	0.0	1.1
%Native Hawaiian/ other Pacific Islander	0.0	0.1	0.0	0.2**	0.4	0.1
% Multi-race	0.8	0.4	0.8	0.6**	0.8	0.8
% Hispanic <sup>c</sup>	9.2	5.4*	7.4	5.5	5.1	6.5
<b>% Urban<sup>a</sup></b>	74.7	75.6	82.9	94.5***	70.0	73.8
<b>% Dual<sup>a</sup></b>	24.2	23.0	8.3	8.3	9.8	10.4
<b>Income<sup>b</sup></b>						
% less than \$20,000	32.7	40.2*	32.5	19.1***	30.2	29.2
% \$20,000-\$39,999	32.7	22.7*	34.0	25.9***	26.7	30.0
% \$40,000 or more	34.6	37.2*	33.5	54.9***	43.1	40.9
<b>Educational attainment<sup>b</sup></b>						
% less than high school	11.5	16.0	12.3	6.3***	10.6	8.3
% high school graduate	30.9	28.1	28.4	24.4***	27.6	31.3
% some college/2 year degree	33.8	33.0	36.5	31.5***	30.9	28.4
% 4 year college graduate or higher	23.7	23.0	22.8	37.8***	30.9	32.0

<sup>a</sup> Characteristics are identified through Medicare enrollment data; CMS-HCC risk scores from RAS. The population for this characteristic includes respondents who have at least one year of continuous enrollment in Medicare and who are at least 66 years old.

<sup>50</sup> Not all programs defined completion. We therefore defined “non-completers” (among programs with thresholds) vs. completers and participants attending programs without completion thresholds. We use the phrase “completers” to refer to this latter group.

<sup>b</sup> Characteristics are identified through baseline participant survey data. The population for this characteristic includes all matched respondents to the baseline participant survey.

<sup>c</sup> Hispanic ethnicity is identified separately from race, and therefore percentages within the Race/Ethnicity category do not sum to 100 percent.

Notes: Asterisks indicate statistically significant differences from non-completing participants in the ACA priority area. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table H.2: Difference-in-Difference of SF-36 Health Status Outcomes by Program Type, ITT Analysis**

<b>Measures</b>	<b>Chronic Disease Management Programs</b>  (Change in Participants – Change in Controls)	<b>Physical Activity, Nutrition, and Obesity Programs</b>  (Change in Participants – Change in Controls)	<b>Falls Prevention Programs</b>  (Change in Participants – Change in Controls)
<b>Physical Components Summary Score</b>			
<i>N (Controls/Participants)</i>	721/617	829/740	1583/1410
<i>DiD Estimate</i>	0.170	0.225	-0.195
<i>90% Confidence Interval</i>	(-0.406,0.746)	(-0.355,0.804)	(-0.595,0.206)
<i>P-Value</i>	0.626	0.523	0.423
<b>Physical Functioning Subscale</b>			
<i>N (Controls/Participants)</i>	722/641	835/763	1592/1470
<i>DiD Estimate</i>	0.785*	0.313	-0.016
<i>90% Confidence Interval</i>	(0.113,1.457)	(-0.298,0.923)	(-0.453,0.421)
<i>P-Value</i>	0.055	0.399	0.951
<b>Role Physical Subscale</b>			
<i>N (Controls/Participants)</i>	721/616	835/740	1591/1409
<i>DiD Estimate</i>	0.634	0.742*	0.701**
<i>90% Confidence Interval</i>	(-0.070,1.338)	(0.050,1.433)	(0.214,1.188)
<i>P-Value</i>	0.138	0.078	0.018
<b>Bodily Pain Subscale</b>			
<i>N (Controls/Participants)</i>	731/615	841/739	1613/1410
<i>DiD Estimate</i>	-0.153	0.599	0.319
<i>90% Confidence Interval</i>	(-0.928,0.622)	(-0.158,1.356)	-0.1725 0.8112
<i>P-Value</i>	0.745	0.193	0.2845
<b>General Health Subscale</b>			
<i>N (Controls/Participants)</i>	734/641	850/763	1627/1468
<i>DiD Estimate</i>	0.477	-0.200	-0.158
<i>90% Confidence Interval</i>	(-0.241,1.196)	(-0.781,0.380)	(-0.534,0.219)
<i>P-Value</i>	0.273	0.569	0.490

Notes: Includes program completers, non-completers, and their matches; estimates represent the Intention to Treat (ITT) effect. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table H.3: Difference-in-Difference of SF-36 Mental Health Status Outcomes by Program Type, ITT Analysis**

<b>Measures</b>	<b>Chronic Disease Management Programs</b>  (Change in Participants – Change in Controls)	<b>Physical Activity, Nutrition, and Obesity Programs</b>  (Change in Participants – Change in Controls)	<b>Falls Prevention Programs</b>  (Change in Participants – Change in Controls)
<b>Mental Components Summary Score</b>			
<i>N (Controls/Participants)</i>	721/617	829/740	1583/1410
<i>DiD Estimate</i>	0.594	0.654	1.064***
<i>90% Confidence Interval</i>	(-0.212,1.400)	(-0.070,1.378)	(0.535,1.593)
<i>P-Value</i>	0.225	0.137	0.001
<b>Vitality Subscale</b>			
<i>N (Controls/Participants)</i>	733/640	845/763	1618/1468
<i>DiD Estimate</i>	-0.097	0.192	0.002
<i>90% Confidence Interval</i>	(-0.830,0.635)	(-0.431,0.814)	(-0.471,0.476)
<i>P-Value</i>	0.826	0.611	0.993
<b>Social Functioning Subscale</b>			
<i>N (Controls/Participants)</i>	733/639	843/762	1617/1465
<i>DiD Estimate</i>	-0.379	0.501	0.313
<i>90% Confidence Interval</i>	(-1.312,0.554)	(-0.238,1.239)	(-0.276,0.902)
<i>P-Value</i>	0.503	0.264	0.381
<b>Role Emotional Subscale</b>			
<i>N (Controls/Participants)</i>	717/613	832/734	1585/1399
<i>DiD Estimate</i>	1.201**	1.061**	1.649***
<i>90% Confidence Interval</i>	(0.229,2.173)	(0.189,1.933)	(0.998,2.300)
<i>P-Value</i>	0.042	0.046	<.0001
<b>Mental Health Subscale</b>			
<i>N (Controls/Participants)</i>	733/640	845/763	1618/1469
<i>DiD Estimate</i>	1.175**	0.369	0.805***
<i>90% Confidence Interval</i>	(0.424,1.926)	(-0.260,0.997)	(0.339,1.271)
<i>P-Value</i>	0.010	0.333	0.005

Notes: Includes program completers, non-completers, and their matches; estimates represent the Intention to Treat (ITT) effect. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table H.4: Difference-in-Difference of Rapid Assessment of Physical Activity (RAPA) Scales by Program Type, ITT Analysis**

Measures	Chronic Disease Management Programs (Change in Participants – Change in Controls)	Physical Activity, Nutrition, and Obesity Programs (Change in Participants – Change in Controls)	Falls Prevention Programs (Change in Participants – Change in Controls)
<b>RAPA – Aerobic Activity</b>			
<i>N (Controls/Participants)</i>	701/626	820/751	1549/1440
<i>DiD Estimate</i>	-0.049	0.197**	-0.246***
<i>90% Confidence Interval</i>	(-0.237,0.140)	(0.059,0.334)	(-0.372,-0.121)
<i>P-Value</i>	0.670	0.019	0.001
<b>RAPA – Strength and Flexibility</b>			
<i>N (Controls/Participants)</i>	683/596	792/698	1474/1352
<i>DiD Estimate</i>	0.014	0.147***	0.036**
<i>90% Confidence Interval</i>	(-0.040,0.068)	(0.102,0.193)	(0.005,0.067)
<i>P-Value</i>	0.659	<.0001	0.057

Notes: Includes program completers, non-completers, and their matches; estimates represent the Intention to Treat (ITT) effect. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table H.5: Difference-in-Difference of Falls and Balance Outcomes by Program Type, ITT Analysis**

Measures	Chronic Disease Management Programs (Change in Participants – Change in Controls)	Physical Activity, Nutrition, and Obesity Programs (Change in Participants – Change in Controls)	Falls Prevention Programs (Change in Participants – Change in Controls)
<b>Presence of Falls in Last Six Months</b>			
<i>N (Controls/Participants)</i>	673/576	791/703	1478/1338
<i>DiD Estimate</i>	0.002	0.022	0.022
<i>90% Confidence Interval</i>	(-0.043,0.047)	(-0.015,0.058)	(-0.011,0.055)
<i>P-Value</i>	0.942	0.332	0.272
<b>Confidence in Balance (ABC) Scale</b>			
<i>N (Controls/Participants)</i>	476/427	548/527	1112/1071
<i>DiD Estimate</i>	3.296**	1.313	2.738***
<i>90% Confidence Interval</i>	(0.878,5.713)	(-0.825,3.451)	(1.143,4.334)
<i>P-Value</i>	0.025	0.312	0.005

Notes: Includes program completers, non-completers, and their matches; estimates represent the Intention to Treat (ITT) effect. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.

**Appendix Table H.6: Difference-in-Difference of Self-Reported Medication Adherence by Program Type, ITT Analysis**

<b>Measures</b>	<b>Chronic Disease Management Programs</b>  (Change in Participants – Change in Controls)	<b>Physical Activity, Nutrition, and Obesity Programs</b>  (Change in Participants – Change in Controls)	<b>Falls Prevention Programs</b>  (Change in Participants – Change in Controls)
<b>Medication Adherence (MAQ-4)</b>			
<i>N (Controls/Participants)</i>	655/565	705/627	1426/1259
<i>DiD Estimate</i>	-0.024	-0.062	0.016
<i>90% Confidence Interval</i>	(-0.135,0.087)	(-0.159,0.034)	(-0.046,0.077)
<i>P-Value</i>	0.723	0.284	0.677

Notes: Includes program completers, non-completers, and their matches; estimates represent the Intention to Treat (ITT) effect. \*p< 0.10; \*\* p< 0.05; \*\*\*p< 0.01.