

## **Satisfaction with Aging and Use of Preventive Health Services**

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Keywords: aging satisfaction, self-perceptions of aging, personal beliefs and attitudes, health  
care utilization, preventive health service, health screening

Table 1: Descriptive statistics from the study sample

Table 2: Unadjusted and adjusted risk ratios between aging satisfaction and self-reported use of  
preventive health services among older adults from the Health and Retirement Study 2010-2012

Abbreviations: HRS = Health and Retirement Study

Words in Text: ~2865 (excluding citations)

Words in Abstract: 180

### **Abstract**

**Objective:** Preventive health service use is relatively low among older age groups. We hypothesized that aging satisfaction would be associated with increased use of preventive health services four years later.

**Method:** We conducted multiple logistic regression analyses on a sample of 6,177 people from the Health and Retirement Study, a nationally representative study of U.S. adults over the age of 50 ( $M$  age = 70.6; women  $n = 3648$ ; men  $n = 2528$ ).

**Results:** Aging satisfaction was not associated with obtaining flu shots. However, in fully-adjusted models, each standard deviation increase in aging satisfaction was associated with higher odds of reporting service use for cholesterol tests ( $OR = 1.10$ , 95% CI = 1.00-1.20). Further, women with higher aging satisfaction were more likely to obtain a mammogram/x-ray ( $OR = 1.17$ , 95% CI = 1.06-1.29) or pap smear ( $OR = 1.10$ , 95% CI = 1.00-1.21). Among men, the odds of obtaining a prostate exam increased with higher aging satisfaction ( $OR = 1.20$  95% CI = 1.09-1.34).

**Conclusion:** These results suggest that aging satisfaction potentially influences preventive health service use after age 50.

**Highlights**

- We examined links between aging satisfaction and use of preventive health services
- Aging satisfaction did not increase the odds of obtaining a flu shot
- Aging satisfaction was associated with increased chronic disease-related screenings
- Aging satisfaction potentially influences preventive service use after age 50

Older adults are less likely to use preventive health services than younger or middle-age adults. Their rates of cancer screenings, flu shots, mammograms, and pap smears are typically below recommended levels (Pham, et al. 2005; Wooten, et al. 2012). Less than 30% of adults aged 50-64 and less than 50% of adults over the age of 65 are up-to-date with core preventive services (Center for Disease Control, 2011; Department of Health and Human Services 2010). Research suggests that increasing the uptake and expanding the delivery of cost-effective preventive services would reduce morbidity and mortality in older adults (Farley, et al. 2010). Contemporary efforts to maximize the use of these services emphasize the importance of an integrated multi-pronged approach (Krist et al 2013; Litaker, et al. 2005). Strategies focus on policy initiatives to enhance access to services, improving physicians' attitudes and delivery of preventive care, and community-based programs.

In addition to health care system factors, research suggests that the knowledge and beliefs of older adults should not be overlooked. Wooten and colleagues (2012), for example, report that in addition to level of education, race and ethnic group, beliefs about the effectiveness of influenza vaccines and perceived risk of susceptibility to disease are associated with vaccination behaviors. An analysis of multiple individual determinants of flu vaccination uptake among 20,453 older adults surveyed in 14 European countries and Israel revealed that, besides socio-demographic and health factors, people who have a healthy lifestyle that includes physical exercise and not smoking were more likely to demand a flu shot (Schmitz and Wübker 2011). Further, fatalistic beliefs about cancer, fear, skepticism about the benefits of screening, and personal perceptions of low risk have also been linked with low rates of cancer screening and engagement in a lifestyle of preventive behavior in older adults (Ferrante, Shaw and Scott 2011; Niederdeppe and Levy 2007). Together, these studies indicate that identifying personal beliefs

and attitudes associated with increased preventive health service use may open innovative avenues of inquiry, which will in turn help increase preventive care behaviors in older adults.

We examined the association between preventive service use and aging satisfaction, a personal attitude that has been of great interest in the psychological literature. In the literature, aging satisfaction is also called self-perceptions of aging and attitudes toward one's own aging (e.g., Kleinspehn-Ammerlahn, Kotter-Grühn and Smith 2008; Lawton 1975; Levy 2009; Sargent-Cox, Anstey and Luszcz 2012). Aging satisfaction measures a person's evaluation of his or her own aging process, including changes in feelings of usefulness, energy level, and quality of life (Lawton 1975). Although aging satisfaction is associated with life satisfaction, the two constructs do not correlate strongly and exhibit unique variation among individuals (Liang and Bollen 1983; Montepare and Lachman 1989). Aging satisfaction is associated with many positive health outcomes in older adults.

People with high aging satisfaction at baseline report better functional health (i.e. absence of disability with daily tasks) over an 18-year follow-up period (Levy, Slade and Kasl 2002). Studies of older adults that model the interactions between changes in health and changes in aging satisfaction over time suggest that the effect of aging satisfaction on health is stronger than the reverse (Sargent-Cox et al. 2012; Wurm, Tesch-Römer and Tomasik 2007). Further, aging satisfaction has been linked with longevity (Kotter-Grühn, et al. 2009; Levy, et al. 2002; Maier and Smith 1999; Sargent-Cox, Anstey and Luszcz 2014). In a 23-year follow-up study, Levy et al (2002) found that people with higher aging satisfaction at baseline ( $M$  age = 63) lived an average of 7.5 years longer than those with lower aging satisfaction. In a study among the oldest of old Germans, Kotter-Grühn et al. (2009) found that people with more positive self-perceptions of aging at baseline ( $M$  age = 85) survived two years longer over a 16 year follow-up period.

These effects were robust and remained after adjusting for age, gender, socioeconomic status, diagnosis of dementia, and physician-based diagnoses of chronic illness.

Might these links between higher aging satisfaction, better health, and survival exist because people with higher aging satisfaction invest in maintaining their health by using preventive care services (Bradford 2010; Ehrlich and Chuma 1990)? We are aware of only one other study that has examined the association between aging satisfaction and preventive care (Levy and Myers 2004). This study used a sample of older adults aged 50-80 and controlled for relevant confounding factors such as age and self-rated health. The researchers found that older adults with higher aging satisfaction practiced more preventive health behaviors (e.g., including eating a balanced diet, exercising, and following directions when taking medications) over an 18-year follow-up period. However, the study did not examine the association between aging satisfaction and use of preventive health services.

The current study aimed to expand upon this important prior research by examining the association between aging satisfaction and preventive health services. We hypothesized that older adults with higher aging satisfaction would use more preventive services including: flu shots, cholesterol tests, mammograms, pap smears, and prostate exams. In the analyses, we adjusted for age, gender, race/ethnicity, marital status, education level, and wealth. We also adjusted for eight major chronic illnesses because they also predict the use of preventive services (Lin et al. 2004).

## **Methods**

### **Study Design and Sample**

We performed our prospective analyses on a sample drawn from the 2008 wave of the Health and Retirement Study (HRS). HRS is an ongoing nationally representative biennial panel study of US adults over the age of 50 sponsored by the National Institute on Aging (grant

number NIA U01AG009740) and conducted by the University of Michigan (<http://hrsonline.isr.umich.edu/>). Since 2008, HRS has included a measure of aging satisfaction in a self-administered psychosocial questionnaire given to participants who complete the core face-to-face interview. In a rotating design, a random 50% of the HRS longitudinal panel are interviewed in person each wave in order to collect physical measures (such as waist size, blood pressure), biomarkers, and psychosocial data (Sonnega, et al. 2014). The remaining 50% of the panel are interviewed by telephone, but their data was not used in this study because they were not asked questions about aging satisfaction. Among people in 2008 who completed the core face-to-face interview, were age eligible, and were not in a nursing home, the completion rate for the leave-behind questionnaire was 89% (Smith et al. 2013).

The HRS protocols are approved by the University of Michigan Health Services Institutional Review Board. Participants are read a confidentiality statement when first contacted by telephone and are informed of the voluntary nature of their participation on the psychosocial questionnaire. Before release, the HRS data are subject to a three-stage iterative process to ensure data confidentiality. Because the present study used de-identified and publicly available data, the Institutional Review Board at the University of Michigan exempted it from review.

The final analytic sample consisted of 6,177 respondents who were assigned non-zero weights for the 2008 psychosocial questionnaire. In order to identify visits that were made in the service of primary prevention, the number of respondents in our analyses changed depending on which preventive service we examined. For example, the pap smear analyses used data only from women with no history of cancer. Sensitivity analyses comparing models with and without adjustment for the relevant disease (e.g., including and excluding women with a history of cancer

in the pap smear exam analyses) indicated little difference in the estimated association between aging satisfaction and use of preventive services.

## **Measures**

### *Preventive Health Service Measurement*

The outcome variables were measured in 2012. Each respondent was asked gender-specific questions regarding use of preventive health services over the last two years (yes/no). In total, HRS asked about five preventive health services recommended by either the United States Preventive Services Task Force (USPSTF) or the Centers for Disease Control (CDC).

Respondents were asked: In the last two years, have you had any of the following medical tests or procedures: A flu shot? A blood test for cholesterol? A mammogram or x-ray of the breast to search for cancer? A pap smear? An examination of your prostate to screen for cancer?

### *Satisfaction with Aging*

Aging satisfaction was measured using five items derived from the Attitudes Toward Own Aging subscale from the Philadelphia Geriatric Center Morale Scale (Lawton 1975; Liang and Bollen 1983). Using a 6-point Likert scale, respondents in HRS indicated the degree to which they endorsed the following five items: “Things keep getting worse as I get older,” “I have as much as pep as I did last year,” “The older I get, the more useless I feel,” “I am as happy now as I was when I was younger,” and “As I get older, things are better than I thought they would be.” The appropriate items were reverse scored, then all of the scores were averaged – with higher scores reflecting higher aging satisfaction (Cronbach’s  $\alpha = 0.73$ ;  $M = 4.01$ ,  $SD = 1.11$ ). The aging satisfaction scores were then standardized ( $M = 0$ ,  $SD = 1$ ) so that the outcome odds ratio could be interpreted as the result of a one standard deviation increase in aging satisfaction.

### *Covariates Measurement*

All of the covariates were collected at baseline in 2008. Covariates included: age, gender, race/ethnicity (Caucasian-American, African-American, Hispanic, Other), (married/not married), educational attainment (no degree, GED or high school diploma, college degree or higher), total wealth (<25,000; 25,000-124,999; 125,000-299,999; 300,000-649,999; >650,000—based on quintiles of the score distribution in this sample), and an index of major chronic illnesses that ranged from 0 to 8 (See Table 2 notes for the list of all illnesses). Self-reported health measures used in HRS have been rigorously assessed for their validity and reliability (Fisher, et al. 2005).

### **Statistical Analysis**

We conducted unadjusted and adjusted multiple logistic regression analyses to test whether aging satisfaction was associated with preventive health services. With the exception of descriptive analyses, our analyses used procedures to account for the complex multistage probability HRS survey design and were weighted to be nationally representative of the population over 50. Stata 13 (StataCorp. 2013) was used for all analyses.

### **Missing Data Analysis**

For all study variables, the overall item non-response rate was only 4.45%. However, the missing data were distributed across variables, resulting in a 20.71% loss of respondents when complete-case analyses were attempted. Therefore, to examine the impact of missing data on our results and to obtain less biased estimates, multivariate normal multiple imputation procedures were used to impute missing data. Missing values were imputed multiple ( $M = 10$ ) times using the “mi estimate” command in Stata. Sensitivity analyses showed that the pattern of significance before and after the implementation of multiple imputations was the same (except for cholesterol tests, which was marginally non-significant ( $p = .055$ ) before multiple imputation, but marginally significant after multiple imputation ( $p = .042$ ). Parameter estimate changes, before and after

imputation, ranged from 0% to 5.85%. We therefore used the dataset with multiple imputation for all logistic regression analyses reported here because this technique provides a more accurate estimate of association than other methods of handling missing data (Collins, Schafer and Kam 2001; Little and Rubin 2002).

### **Results**

The average age of respondents at baseline was 71 years ( $SD = 9.38$ ). The majority of respondents were women (59%), European-American (77%), and married (61%). Most had a high school degree (54%) or attended some college (25%). Physically, respondents had about one to two chronic illnesses ( $SD = 1.44$ ). The descriptive statistics are displayed in Table 1.

The pattern of findings for each service was similar across the unadjusted and adjusted models (Table 2). In unadjusted, age-adjusted, and fully-adjusted models, aging satisfaction was not associated with obtaining preventive flu shots. However, higher aging satisfaction was associated with a higher likelihood of using other preventive services in all models. For example, in fully-adjusted models each standard deviation increase in aging satisfaction was associated with a higher likelihood of receiving a cholesterol test ( $OR = 1.10$ , 95% CI = 1.00-1.20). Further, among women, each standard deviation increase in aging satisfaction was associated with obtaining a mammogram/breast x-ray ( $OR = 1.17$ , 95% CI = 1.06-1.29) or pap smear ( $OR = 1.10$ , 95% CI = 1.00-1.21). Among men, each standard deviation increase in aging satisfaction was associated with a higher likelihood of obtaining a prostate exam ( $OR = 1.20$ , 95% CI = 1.09-1.34).

### **Discussion**

The results indicate that higher aging satisfaction was prospectively associated with a higher likelihood of using several preventive health services in a nationally representative sample

of U.S. adults over the age of 50. Contrary to our hypothesis, aging satisfaction was not associated with flu shots. However, higher aging satisfaction was associated with a higher likelihood of using several chronic disease-related screenings, including cholesterol tests, mammograms, pap smears, and prostate exams. The associations were found in unadjusted, age-adjusted, and fully-adjusted models that included covariates for age, race, gender, marital status, education level, wealth, and an index of eight major chronic illness. These results expand upon prior research, which showed that higher aging satisfaction was prospectively associated with several preventive health behaviors (e.g., medication use and eating a healthy diet) in a sample of older adults (Levy and Myers 2004). Levy and Myers (2004) also identified aging satisfaction as an additional personal belief factor that should be examined in future studies of preventive health service use among older adults.

The association between aging satisfaction and use of preventive services by older adults might be explained by people's general beliefs about the aging process. Prior research shows that older adults who believe that health problems are inevitable in older age are less likely to engage in preventive health behaviors (Ferrante et al. 2011; Niederdeppe and Levy 2007) or to believe that seeking preventive care is important (Sarkisian, Hays and Mangione 2002). Goodwin, Black and Satish (1999), for example, found that older adults who considered heart disease, difficulty sleeping, and arthritis inevitable in old age sought out less preventive care and were less likely to participate in regular physician visits. Studies also find that people who attribute having had a heart attack or stroke to their age, as opposed to lifestyle choices, are less likely to make lifestyle changes after the event (Stewart, et al. 2014). If older adults with lower aging satisfaction believe that physical and mental declines typify old age, they may be less likely to believe that lifestyle changes will make a difference, and consequently, may be less likely to seek preventive care.

Levy (2009) proposes that aging satisfaction influences health through three different pathways: psychological, physiological, and behavioral. On the psychological level, older adults' expectations about the aging process act as self-fulfilling prophecies (Levy 2009). Older adults presented with positive age-stereotype primes performed better in both cognitive and physical tasks when compared against those who were presented with negative age-stereotype primes (Levy and Leifheit-Limson 2009). On the physiological level, aging satisfaction alters how older adults respond to stress (Levy, 2009). Older adults who were exposed to positive age-related stereotype primes prior to completing a verbal or mathematical task demonstrated a lower cardiovascular response compared to those exposed to negative primes (Levy, et al. 2000). Further, despite receiving different primes, both groups rated the stressfulness of the tasks similarly. Older adults with more positive age stereotypes also showed better physical recovery from an acute myocardial infarction (Levy, et al. 2006). On the behavioral level, aging satisfaction has been prospectively linked with more preventive health behaviors in older adults (Levy and Myers 2004) and maintenance of health status over time (Sargent-Cox et al. 2012; Wurm, Tesch-Römer and Tomasik 2007).

This study has limitations. We are unsure of why aging satisfaction was not associated with flu shots. Previous studies document the role of numerous attitudes, beliefs, and social network factors in the uptake of influenza vaccine by older adults (Chapman and Coups, 1999; Kumar et al., 2012). The perceived effectiveness of the vaccine, likelihood of side effects, previous flu shot acceptance, and uptake by family, friends, and people in the local community are consistent predictor variables that were not available for analysis in the present study (Chapman and Coups, 1999; Kumar et al., 2012). Together, these factors may have dampened the association between aging satisfaction and uptake of flu shots in this study.

The differential ways in which aging satisfaction is associated with different preventive health services (and why) should be further explored in future studies. Future replication studies with older adults should also examine additional indicators of aging satisfaction and self-perceptions of aging, their associations with beliefs about preventive services, and other indicators of preventive health care use. The size of the association between aging satisfaction and preventive health services was relatively small. In models that adjusted for all covariates, each standard deviation increase in aging satisfaction was associated with a 10% to 20% increased odds of using preventive health services. However relatively small effect sizes often translate into meaningful outcomes, especially when aggregated at the population level (Abelson, 1985; Robert, Kuncel, & Shiner, 2007). Therefore, further research in this area is warranted. We did not account for changes in preventive service guidelines across time. For example, there were changes to national screening guidelines for pap smears and mammograms during the follow-up period in our study, which may have impacted our findings. Future research should account for changes in screening guidelines across time and examine how these changes impact the association between aging satisfaction and preventive service use. We used self-reported measures of preventive health services which may be influenced by response and memory biases. Studies have shown, however, that self-reported health care utilization shows substantial agreement with both administrative claims and medical records (Cleary and Jette 1984; Reijneveld and Stronks 2001; Ritter, et al. 2001; Weissman, et al. 1996). The HRS preventive measures were also evaluated by benchmarking them against other national surveys and shown to have high reliability and validity (Fisher, et al. 2005). It would also be informative to examine if aging satisfaction is differentially important in subgroups of the 50+ population, for example among the very old versus middle-aged, and in different socioeconomic and racial/ethnic groups.

The present study examined associations across a four-year interval. Future research should also investigate contingent and short-term associations.

This study also has several strengths. Our study used a prospective and nationally representative U.S. sample of adults over age 50. We were also able to assess the association between aging satisfaction and preventive health services after adjusting for socio-demographic and health covariates. Given the societal and economic importance of increasing the use of preventive health services in old age, it is important to expand the understanding of how personal perceptions of aging might impact preventive health care behaviors in this age group.

**Funding:** The first author was supported by the Rackham Predoctoral Fellowship.

**Role of the Sponsor:** The funding sources had no influence on the design or conduct of the study; collection, management, analysis or interpretation of the data; or preparation, review, or approval of the manuscript. Eric S. Kim had full access to all data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. All authors contributed to the design of the study and interpretation of the findings, and have read, commented on, and approved the manuscript.

**Conflict of interest statement:** The authors declare that they have no conflict of interest.

**Acknowledgments:** We would like to acknowledge the Health and Retirement Study, which is conducted by the Institute for Social Research at the University of Michigan, with grants from the National Institute on Aging (U01AG09740) and the Social Security Administration. We would also like to thank the editors and the anonymous reviewers for their valuable comments and suggestions.

**Conflict of Interest Statement:** The authors declare that there are no conflicts of interest.

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## AGING SATISFACTION AND PREVENTIVE SERVICE USE

 Table 1  
 Descriptive statistics from the study sample<sup>a</sup>

	Total ( <i>N</i> = 6,177)	Women ( <i>n</i> = 3,648)	Men ( <i>n</i> = 2,529)
<i>Participant characteristics 2008</i>			
Mean Age (SD)	70.58 (9.38)	70.51 (9.50)	70.68 (9.19)
Race/Ethnicity			
Caucasian	76.91	75.50	78.96
African-American	13.19	14.14	11.83
Hispanic	8.43	8.82	7.87
Other	1.46	1.53	1.34
Married Status	60.82	50.75	75.36
Education			
< High School	20.56	20.77	20.26
High School	53.95	57.29	49.14
≥ College	25.48	21.94	30.60
Total Wealth			
1st Quintile	17.60	19.90	14.28
2nd Quintile	20.43	21.76	18.51
3rd Quintile	20.35	19.48	21.60
4th Quintile	20.01	19.59	20.61
5th Quintile	21.61	19.27	25.00
Mean Index of Chronic Illnesses (SD)	1.44	1.43	1.46
<i>Self-reported use of preventive health services from 2010-2012</i>			
Influenza vaccination ( <i>n</i> = 6,176)	66.89	67.55	65.96
Cholesterol test ( <i>n</i> = 4,231) <sup>b</sup>	78.99	79.39	78.34
Mammogram/Breast XRAY ( <i>n</i> = 3,086) <sup>c</sup>		60.49	
Pap smear ( <i>n</i> = 3,086) <sup>c</sup>		33.98	
Prostrate exam ( <i>n</i> = 2,078) <sup>d</sup>			60.63

<sup>a</sup>Unweighted sample data. Unless otherwise noted, values are percentages

<sup>b</sup>Included only people with no history of heart disease or stroke

<sup>c</sup>Included only women with no history of cancer

<sup>d</sup>Included men with no history of cancer