Published in final edited form as:
Womens Health Issues. 2006 ; 16(6): 286–296.

DISABILITY AND RECEIPT OF CLINICAL PREVENTIVE SERVICES AMONG WOMEN

Wenhui Wei, PhD[a,b,*], **Patricia A. Findley, DrPH, MSW, LCSW**[b,c], and **Usha Sambamoorthi, PhD**[a,b,d]

a *Institute for Health, Health Care Policy, and Aging Research, Rutgers University, New Brunswick, New Jersey*

b *HSR&D Center for Health Care Knowledge and Management, VA New Jersey Health Care System, East Orange, New Jersey*

c *School of Social Work, Rutgers University, New Brunswick, New Jersey*

d *Division of Health Systems and Policy, School of Public Health, University of Dentistry and Medicine of New Jersey, New Brunswick, New Jersey*

Abstract

Background— More individuals are surviving catastrophic injuries and living longer with persistent disability; however, their receipt of clinical preventive services is not well understood as compared with those without disabilities given the dual focus of care on both primary prevention and the prevention of secondary complications related to their disabilities.

Methods— Longitudinal analyses of 1999–2002 Medical Expenditure Survey (MEPS). Study sample consisted of 3,183 community-dwelling women aged 51–64 years and followed for 2 full years. Women with disabilities were defined as having reported any limitation in any area of activity of daily living in 2 years. Recommended clinical preventive services were defined as receiving the following at the recommended intervals: colorectal, cervical, and breast cancer; cholesterol screening; and influenza immunization. χ^2 tests and multiple logistic regressions were used to examine variations in use of clinical preventive services.

Results— Overall, 23% of the women in the study (n = 835) were disabled. Disabled women, however, were less likely to receive mammography and Pap smears within the recommended intervals. However, disabled women were more likely to receive influenza immunization, cholesterol screening, and colorectal screening within the recommended intervals. Among the disabled, usual source of care and health insurance remained significant predictors of receipt of clinical preventive services across all types,

Conclusions— Disabled women were less likely to receive some of the cancer screening services, suggesting a need for targeted interventions to promote breast cancer and cervical cancer screening. Increased access to health care insurance and health care providers may also help.

Introduction

In 2000, nearly 50 million people in the US lived with some type of long-lasting disability (Waldrop & Stern, 2003). In older ages, the rate of disability among women is higher than men (Freedman, Martin, & Schoeni, 2004). Overall, the life expectancy of those who survive catastrophic injuries has increased (Lollar, 2002), partially because of the ability to treat and manage complex medical issues, as well as the related disabilities. However, living with a

* Correspondence to: Wenhui Wei, PhD, 23 Ewing Drive, Piscat-away, NJ 08854. E-mail: weiwenhui@gmail.com.

disability requires participation in health promotion and preventive care activities similar to the general population. The goal of health care for individuals with disabilities is 2-pronged, with a focus on both primary preventive care for general health and on secondary prevention aimed at preventing or reducing secondary complications related to the original disability (Rimmer, 1999). *Healthy People 2010* included a section to target disability to encourage health care, particularly for areas of secondary complications or comorbidities (US Department of Health and Human Services, 2000). Therefore, much recent research has focused on preventing secondary complications seemingly deemphasizing primary general health prevention efforts (Coyle & Santiago, 2002;Klingbeil, Baer, & Wilson, 2004;Zorowitz, Gross, & Polinski, 2002).

Individuals with disability or high-risk chronic disease should be carefully screened for prevention of other diseases that could interact to cause further disability (Fried, Bandeen-Roche, Kasper, & Guralnik, 1999). However, because other issues related to the medical management of disability, use of clinical preventive services may never occur. Recent theories on clinical preventive services suggest physicians are faced with competing demands during medical encounters with physical comorbidities, chronic illnesses, and psychosocial problems, and that these demands are perceived as major barriers to the provision of clinical preventive services (Flocke, Frank, & Wenger, 2001;Jaen, Stange, & Nutting, 1994;Nutting et al., 2001). Similarly, unrelated disorders are less likely to be treated in patients with chronic illnesses. For example, similar to the disabled in many respects, because of their decreased ability to perform daily tasks and dependency on others for help, elderly patients who have chronic medical diseases have been found to be undertreated for unrelated disorders (Redelmeier, Tan, & Booth, 1998). For example, lower levels of cancer screening services are observed among older adults with common chronic health problems (Fontana, Baumann, Helberg, & Love, 1997). It has also been reported that in family practice, during outpatient illness visits, delivery rates were uniformly lower for all clinical preventive services (Stange, Flocke, Goodwin, Kelly, & Zyzanski, 2000).

In the context of disabled women, these theories and studies seem to suggest missed opportunities for the use of clinical preventive services because of multiple demands that compete for the attention of physicians and patients. Further complicating access is that the disabled may have several care providers. Multiple providers addressing a coordination of disability and other related medical issues may hinder provision of clinical preventive services as the focus of care is disability oriented, causing physicians to unintentionally overlook preventive care needs (Lawthers, Pransky, Peterson, & Himmelstein, 2003).

The few recent studies on the use of clinical preventive services by those with disabilities report mixed results and that the receipt of clinical preventive services varied by type of services. Disability has been reported to be a significant, independent risk factor for not receiving mammograms and Pap smears (Chan et al., 1999). In some studies, disabled women generally reported screening and preventive services at rates comparable to all women (Iezzoni, McCarthy, Davis, Harris-David, & O'Day, 2001). However, women with mobility impairments were less likely to receive cancer screening services (Iezzoni, McCarthy, Davis, & Siebens, 2000). In addition, severity of disability has also been found to affect the receipt of preventive care (Diab & Johnston, 2004). Among women with multiple sclerosis, those with more severe mobility impairment were less likely to receive cancer screening services than those with less impairment (Cheng et al., 2001). In specific subgroups such as American Indians with spinal cord injuries, rates of cholesterol screening were lower compared with those without spinal cord injuries (Krause, Coker, Charlifue, & Whiteneck, 1999).

As mentioned, for some types of clinical preventive services disability was not a barrier. Chan and colleagues (1999) concluded that those with 1 or 2 functional limitations were more likely

to receive influenza vaccinations than those without functional limitations. American Indians with spinal cord injuries reported greater frequency of immunizations for influenza and pneumonia than those without spinal cord injuries (Krause, Coker, Charlifue, & Whiteneck, 1999). Individuals with specific types of disability that involved mobility limitations were as likely as others to receive influenza immunizations (Iezzoni et al., 2000).

Although previous studies have shed some light on the association between presence and severity of disability on receipt of clinical preventive services, these studies have limitations. Most of the studies use cross-sectional designs. Cheng and colleagues (2001) used an antiquated definition of health as the absence of disease. Some studies use data from the early 1990s (Iezzoni et al., 2001) or focus only on specific populations such as Medicare beneficiaries (Chan et al., 1999), selected states (Diab & Johnston, 2004;Ramirez, Farmer, Grant, & Papachristou, 2005), specific type of disability (Iezzoni et al., 2000), or specific subgroups such as American Indians (Krause et al., 1999).

Our study extends previous research by using a nationally representative sample of women aged 51–64 years with and without functional, activity, and sensory limitations living in US households to analyze the association between disability and the receipt of clinical preventive services among women with disability. Our study uses a longitudinal measure of disability by defining functional, activity, and sensory limitations over a 2-year period. In addition, we examine variations in receipt of clinical preventive services by socioeconomic status, race and ethnicity, health status, chronic illness, and access to care among the disabled. In this paper, clinical preventive services consisted of cancer screening services, influenza immunization, and cholesterol screening.

Methods

Study Sample

Our study uses the Household Component of the Medical Expenditure Panel Survey (MEPS), a nationally representative survey of the US noninstitutionalized civilian population. Each year a new panel of individuals is selected and followed for a maximum of 2 years for utilization expenditures and other information over 5 rounds of interviews. For this paper, because of our focus on persistent disability, we used the longitudinal nature of MEPS data to our advantage and studied those with 2 complete years of survey data. The disabled were defined as those reporting any activity limitations in both years of the survey period. To obtain enough sample size for certain subgroups, we pooled respondents from panel 4 (1999–2000), panel 5 (2000–2001), and panel 6 (2001–2002). We further restricted our sample respondents to those aged 51–64 years because of the recommendation for all clinical preventive services for this age group (US Preventive Services Task Force (USPSTF), 2005) and who were alive at the end of their survey period. Our final study sample included 3,813 individuals (1,718 in panel 4, 1,349 in panel 5, and 2,897 in panel 6).

Measures

Clinical preventive services—In the MEPS, respondents were asked about time elapsed since receipt of certain clinical preventive services: within past year, within past 2 years, within last three years, within past five years, more than five years, or never. We used responses to these questions to derive clinical preventive services within recommended timeframe.

Cancer Screening Services included mammography, Papanicolaou (Pap) smear testing and colorectal screening. Based on the USPSTF guidelines, we considered women who received mammography within the last 2 years and Pap testing within the last three years as receiving appropriate preventive care in each of these services. The USPSTF guidelines strongly

recommends that clinicians screen for colorectal cancer in all adults 50 years of age or older who are at average risk for colorectal cancer, however, there are several tests and the optimal interval for screening depends on the test. Therefore, as testing may include fecal occult blood testing, sigmoidoscopy, or colonoscopy; we considered women who were ever tested using any method for colorectal cancer as receiving it as recommended preventive care. Women receiving influenza immunization within the past year were considered as having appropriate preventive care because the USPSTF recommends routine yearly vaccination for individuals over 50 years (US Preventive Services Task Force, 2005). We considered cholesterol screening every 5 years as appropriate use of this preventive service based on the experts' recommendation (National Heart Lung and Blood Institute, 1998).

Independent Variables

There are a variety of definitions of *disability* and no uniform or gold standard definition has been established because of the numerous perspectives on disability (e.g., medical, economic, sociopolitical, and administrative; Altman, 2001;Freedman et al., 2004;McNeil, 1997). The current study uses World Health Organization Model linking persistent limitations to disability (Albrecht, Seelman, & Bury, 2001). In each survey year, MEPS contains information on any limitation (ANYLIM) as having any functional, activity, and/or sensory limitation in any of the pertinent rounds, using the following component variables: whether need help/supervision in instrumental activities of daily living; whether need help/supervision in activities of daily living; whether have difficulty in performing certain specific physical actions; whether have any limitation in work, housework, or school; whether have difficulty seeing (with glasses or contacts, if used); and whether have difficulty hearing (with a hearing aid, if used) (Agency for Healthcare Research and Quality, 2002,2003a,2004a,2005a). In the current study, we used this variable and broadly defined disability as reporting of limitations in both years.

Some individuals only reported limitations in 1 of the survey years (n = 490, 15%); these individuals did not meet our definition of disability and, therefore, were not included in the current study. However, to test the robustness of our findings, we performed sensitivity analyses by including them in the nondisabled population. Findings from those analyses were similar to those reported in the current paper and therefore are not presented here.

Demographic variables included race/ethnicity, age, marital status, and area of residence. Race/ethnicity was characterized as African American, white, Latino, and others. Because the effect of age is likely to be nonlinear, we categorized age into 3 groups: 51–55 years, 56–60 years, and 61–64 years. Marital status was classified as married, widowed, divorced or separated, or never married. Area of residence of the respondent was classified as metropolitan or rural.

Socioeconomic characteristics included education, employment, and poverty level. Education was grouped into 3 categories, namely those with 1) less than high school, 2) high school, or 3) above high school education. Employment status was measured as ever being employed during the survey period (employed or not). Individual income was measured as a percentage of the federal poverty level (FPL): 1) poor, <100% of FPL; 2) near poor, 100%–199% of FPL; 3) middle income, 200%–399% of FPL; or 4) high income, ≥ 400% FPL.

Access to care was measured by health insurance coverage and usual source of health care. The health insurance variable was defined hierarchically as any private insurance, public insurance only, or having no insurance during the 2-year survey period. Usual source of care was based on whether the respondent had a usual source and where they sought care. We categorized the source of care variable as 1) no usual source of care; 2) care by primary care physicians (PCP); and 3) care by others, such as non-PCPs, nurse/nurse practitioners, physician's assistants, chiropractors.

Lifestyle behavior was measured by the respondent's body mass index (BMI) during the base year and categorized as 1) under/normal weight (BMI <25); 2) overweight (BMI 25–29.9); or 3) obese (BMI >30). Health status was assessed with variables indicating perceived physical and mental health status and presence of chronic physical conditions such as asthma, cancer, diabetes, heart disease, and hypertension, and any mental illness during the survey period. Finally, indicator variables were created for each panel to adjust for possible time trends.

Statistical Analyses

χ^2 tests were used to examine subgroup differences in rates of receiving for each type of clinical preventive services. Separate multiple logistic regressions were used to analyze the association of between disability and the receipt of clinical preventive services and to determine the factors affecting the likelihood of receiving clinical preventive services among the disabled.

All analyses were conducted in SUDAAN version 8 (Research Triangle Institute, 2001) to account for the design effect and longitudinal sampling weights of MEPS (Agency for Healthcare Research and Quality, 2003b,2004b,2005b) to reflect the national population.

Results

Of the 3,813 women in the MEPS sample, 835 (23.3%) were disabled. Disabled women were more likely to be African American, older, separated or divorced, and have lower socioeconomic status in terms of education, income level, and health insurance coverage, compared with nondisabled women (data not shown). Twenty-eight percent of disabled women relied on only public insurance for health insurance coverage; 8% were uninsured. Over half of them (54.2%) were unemployed throughout the survey period. The proportion of having PCP as usual source of care was similar between disabled women and others, but an additional 44% disabled women received usual health care from non-PCP health professionals, versus 38% among nondisabled women. Disability was also associated with obesity, worse perceived physical and mental health, and higher rate of chronic diseases such as diabetes, cancer, heart disease, hypertension, asthma, and mental illness.

Table 1 presents the unadjusted rates of clinical preventive services and the adjusted odds ratios (AOR) of receiving of clinical preventive services by disabled women from separate multiple logistic regressions. For each type of clinical preventive services, significant differences were found by disability status. Disability was significantly associated with lower rates of receipt of mammograms (81% vs 87%; AOR, 0.63; 95% confidence interval [CI], 0.44–0.89) and Pap smears (79% vs 88%; AOR, 0.64; 95% CI, 0.48–0.85). However, disabled women were more likely to receive colorectal screening (41% vs 31%; AOR, 1.37; 95% CI, 1.08–1.73) and influenza immunization (50% versus 39%; AOR, 1.54; 95% CI, 1.16–2.04). No significant association was found between disability status and cholesterol screening.

Among disabled women, for each type, we found significant demographic and socioeconomic differences in receipt of clinical preventive services (Table 2). Compared with those with private or public insurance, those without health insurance had the lowest rates across all types of clinical preventive services: mammogram (50% versus 73% and 81%); Pap smear (59% versus 72% and 81%); colorectal screening (17% versus 29% and 49%); influenza immunization (26% versus 54% and 52%); and cholesterol screening (71% versus 92% and 95%). Similarly, the rates of clinical preventive services were the lowest among those without a usual source of care than others. However, the group differences were not statistically significant for colorectal screening or influenza immunization.

These findings persisted when controlling for individual sociodemographic characteristics, access to care and health factors (Table 3). Multiple logistic regressions on each type revealed

that disabled women with insurance are more likely to receive each type of clinical preventive services compared to those without any health insurance throughout the study period. For example, the AOR for those with public insurance only ranged from 1.94 for Pap smear to as high as 4.47 for cholesterol screening. AORs for private insurance ranged from 2.71 for influenza immunization to 4.83 for cholesterol screening. Disabled women with a usual source of care (PCP or non-PCP), in general, were 4 times more likely than those without usual source of care to receive mammograms, Pap smears, and cholesterol screenings.

Even after controlling for other factors, racial minorities were still less likely to receive some of the clinical preventive services. African Americans were half as likely as whites to receive influenza immunization (AOR, 0.49; 95% CI, 0.30–0.81 and 62% less likely to receive cholesterol screenings (AOR, 0.28; 95% CI, 0.11–0.67). However, this was not the case with some of the cancer screening services. For example, Latina women were more than twice more likely than whites to receive mammogram (AOR, 2.64; 95% CI, 1.32–5.27) and Pap smear (AOR, 4.56; 95% CI, 1.86–11.18).

Discussion

Rates of clinical preventive services found in this study are in the range reported in the published literature for both the overall population (Nelson, Bland, et al., 2002) and those with disabilities (Diab & Johnston, 2004). Our findings confirmed from a national perspective that disability had a significant negative effect on receiving mammograms and Pap smears (Ramirez et al., 2005), but a positive effect on colorectal screening and influenza immunization (Department of Health, New York State, 2002). A plausible reason for low rates of Pap smear, as suggested by Nosek and Howland (1997), could be that clinicians may assume that the severity of the woman's disability may limit her sexual activity and may not provide Pap smears because they view these disabled women as being at low risk for cervical cancer. The lower rates of mammography and Pap smear among the disabled may also result from the difficulties of the actual testing/screening process for the disabled women, especially for those with mobility limitations; mammogram requires that the patient stand and the Pap smear require the patient be on an examination table. Although we could not identify mobility limitations as the cause of disability separately, it has also been found that individuals with mobility problems were as likely as others to receive pneumonia and influenza immunizations, but less likely to receive mammogram and Pap smear (Iezzoni et al., 2000). People with disabilities, especially intellectual disability, may experience more fear and anxiety about the cancer screening than the general population (Sullivan, Slack-Smith, & Hussain, 2004). Also like older people, people with disability have relatively shorter life expectancy and cancer screening may not be beneficial to them (Balducci, 2005).

Contrary to the previous study in California that found no difference in receipt of colonoscopy by disability status (Ramirez et al., 2005), in our study women with disability were found to be more likely to receive colorectal screening, as in another study from New York state (Department of Health, New York State, 2002). It has been found that in patients ≥50 years, asymptomatic screening (average-risk screening colonoscopy, positive family history, or fecal occult blood test positivity) accounted only for 38.1% of all colonoscopies (Lieberman, Holub, Eisen, Kraemer, & Morris, 2005). Therefore, higher rates of colorectal screening found in women with disability may be related to diagnostic purposes rather than for preventive screening.

Additionally, we found that having a usual source of care increased the likelihood of receiving all types of clinical preventive services, which was also consistent with findings from studies in the general population (Corbie-Smith, Flagg, Doyle, & O'Brien, 2002;Ettner, 1996;Mandelblatt et al., 1999;Selvin & Brett, 2003). Thus, our findings document the crucial

role of having a usual source of care in promoting receipt of clinical preventive services because 96% of individuals go to their usual providers for preventive care (Fryer, Dovey, & Green, 2000).

Considered together, we observed >7% of the disabled women either did not have a usual source of care or were uninsured (data not shown). It has been suggested that insured adults with a usual source of care are most likely to receive preventive care and uninsured adults without regular care were least likely to have received such services (DeVoe, Fryer, Phillips, & Green, 2003). Our findings suggest that innovative strategies may be needed to target women who have no access to health care either in terms of health insurance or usual source of health care.

Although having a disability was not a barrier to annual influenza immunization or cholesterol screening, we found that among women with disabilities, African American women were less likely than whites to receive influenza immunization and cholesterol screenings as recommended. There is overwhelming evidence of racial and ethnic disparities in influenza vaccination (Centers for Disease Control and Prevention, 2003;Sambamoorthi & Findley, 2005) and cholesterol screening (Brown, Giles, Greenlund, & Croft, 2001;Centers for Disease Control and Prevention, 2005;Nelson, Norris, & Mangione, 2002). Our findings point to the need for promoting cholesterol screening among African American women with disability. Eliminating these racial disparities requires a clear understanding of why these disparities occur. For example, some of the reasons for lower rates of cholesterol screening among African Americans could be lack of knowledge about cholesterol (Thomas, Lackland, & Taylor, 2000), poor patient–physician communications that affect health service use (Ashton et al., 2003), or lack of affordability of treatment if diagnosed with the conditions (Reed, Hargraves, & Cassil, 2003). In the case of influenza immunization, in 1 study, disparities in care were not explained by commonly used access factors (e.g., family income, type of health insurance, usual source of care; Fiscella, Franks, Doescher, & Saver, 2002). In other studies, racial disparities in immunization were related to differences in attitudes in terms of resistance to immunization (Hebert, Frick, Kane, & McBean, 2005). One could speculate that other reasons for such differences may be due to patient's lack of awareness about the need (Jones, Ingram, Craig, & Schaffner, 2004), health literacy (Scott, Gazmararian, Williams, & Baker, 2002), patient's beliefs (Cornford & Morgan, 1999), or fear of undisclosed contents of the vaccination (Armstrong, Berlin, Schwartz, Propert, & Ubel, 2001).

Our findings highlight the need for further research on the causes of racial disparities in preventive care among women with disability. However, existing research gives us some directions. For example, a meta-analysis of effectiveness of interventions to increase influenza immunization suggests that (Stone et al., 2002) organizational changes in staffing and clinical procedures and self-management through patient financial incentives and reminders are most effective, and that a combination of interventions tends to further increase the benefits. Therefore, a combination of various interventions may be needed to improve influenza vaccination and cholesterol screening will be needed among African American women.

Some limitations of our study should be noted. We used self-reports for measuring clinical preventive services, which may be subject to recall bias. In recent years, studies have assessed sensitivity and specificity of patient self-report of influenza immunization (Mac Donald, Baken, Nelson, & Nichol, 1999;Martin, Leff, Calonge, Garrett, & Nelson, 2000;Zimmerman, Raymund, Janosky, Nowalk, & Fine, 2003). A comparison of self-reported measures with medical record data showed respondents with diabetes may be more likely to overestimate annual influenza immunization (Harwell et al., 2001). However, other studies conclude self-reports are highly sensitive and moderately specific for influenza vaccination (Zimmerman et al., 2003). Similarly for mammograms and Pap smears, studies generally state self-report data

for these screenings are valid for use for population-based studies, but caution should be used for clinical studies where precision is required (Zapka et al., 1996). Although self-report of mammography use was consistently higher than medical record documentation of use (Tumiel-Berhalter, Finney, & Jaen, 2004), specificity or negative predictive value of recall of mammography in the previous year has been reported at 91% (McGovern, Lurie, Margolis, & Slater, 1998). For Pap smears, Tumiel-Berhalter and colleagues (2004) found 90.8% agreement of self-report and chart review for recall within the past 3 years. Similarly, self-report of colon cancer screening behavior have been shown to be reliable (Baier et al., 2000). In addition, MEPS does not distinguish between screening and diagnostic procedures of cancer tests. Thus, actual rates of cancer screening might be lower than those reported, especially in the case of colorectal screening (Lieberman et al., 2005).

In summary, our study extends the previous research on clinical preventive services among women by examining both the impact of disability and subgroup differences among those with disability, by using a nationally representative data, and by using a longitudinal and parsimonious definition of disability (Verbrugge, Merrill, & Liu, 1999). Our study findings suggest that in a nationally representative household sample, disability is still a barrier to certain clinical preventive services despite extensive controls for demographic factors, socioeconomic status, and access to care. These findings imply that a key issue for improving women's health care is to identify those who are at risk for specific measures of preventive care and also recognize subgroup disparities in care. Opportunities exist to improve clinical preventive services and the findings from the current study will be helpful in targeting interventions toward specific groups of women for specific measures of preventive care to receive these important services.

Acknowledgements

The findings and opinions reported here are those of the authors and do not necessarily represent the views of any other individuals or organizations. This work was partially supported by Dr. Findley's K23 Award (HD40779) under the National Institute of Child Health and Human Development.

References

Agency for Healthcare Research and Quality. MEPS HC-038: 1999 full year consolidated data file. Rockville, MD: Author; 2002.

Agency for Healthcare Research and Quality. MEPS HC-050: 2000 full year consolidated data file. Rockville, MD: Author; 2003a.

Agency for Healthcare Research and Quality. MEPS HC-058: Panel 4 (1999–2000) longitudinal weight file. Rockville, MD: Author; 2003b.

Agency for Healthcare Research and Quality. MEPS HC-060: 2001 full year consolidated data file. Rockville, MD: Author; 2004a.

Agency for Healthcare Research and Quality. MEPS HC-065: Panel 5 (2000–2001) longitudinal weight file. Rockville, MD: Author; 2004b.

Agency for Healthcare Research and Quality. MEPS HC-070: 2002 full year consolidated data file. Rockville, MD: Author; 2005a.

Agency for Healthcare Research and Quality. MEPS HC-071: Panel 6 (2001–2002) longitudinal weight file. Rockville, MD: Author; 2005b.

Albrecht, GL.; Seelman, KD.; Bury, M. Handbook of disability studies. Thousand Oaks, CA: Sage; 2001.

Altman, BM. Disability definitions, models, classifications, and applications. In: Albrecht, GL.; Seelman, KD.; Bury, M., editors. Handbook of disability studies. Thousand Oaks, CA: Sage; 2001. p. 97-122.

Armstrong K, Berlin M, Schwartz JS, Propert K, Ubel PA. Barriers to influenza immunization in a low-income urban population. American Journal of Preventive Medicine 2001;20:21–25. [PubMed: 11137770]

Ashton CM, Haidet P, Paterniti DA, Collins TC, Gordon HS, O'Malley K, et al. Racial and ethnic disparities in the use of health services: Bias, preferences, or poor communication? Journal of General Internal Medicine 2003;18:146–152. [PubMed: 12542590]

Baier M, Calonge N, Cutter G, McClatchey M, Schoentgen S, Hines S, et al. Validity of self-reported colorectal cancer screening behavior. Cancer Epidemiology, Biomarkers and Prevention 2000;9:229–232.

Balducci L. Prevention of cancer in the older person. Cancer Journal 2005;11:442–448.

Brown DW, Giles WH, Greenlund KJ, Croft JB. Disparities in cholesterol screening: Falling short of a national health objective. Preventive Medicine 2001;33:517–522. [PubMed: 11716645]

Centers for Disease Control and Prevention. Racial/ethnic disparities in influenza and pneumococcal vaccination levels among persons aged > or =65 years—United States, 1989–2001. MMWR Morbidity and Mortality Weekly Report 2003;52:958–962. [PubMed: 14534511]

Centers for Disease Control and Prevention. Disparities in screening for and awareness of high blood cholesterol—United States, 1999–2002. MMWR Morbidity and Mortality Weekly Report 2005;54:117–119.

Chan L, Doctor JN, MacLehose RF, Lawson H, Rosenblatt RA, Baldwin LM, et al. Do Medicare patients with disabilities receive preventive services? A population-based study. Archives of Physical Medicine and Rehabilitation 1999;80:642–646. [PubMed: 10378489]

Cheng E, Myers L, Wolf S, Shatin D, Cui XP, Ellison G, et al. Mobility impairments and use of preventive services in women with multiple sclerosis: Observational study. BMJ 2001;323:968–969. [PubMed: 11679386]

Corbie-Smith G, Flagg EW, Doyle JP, O'Brien MA. Influence of usual source of care on differences by race/ethnicity in receipt of preventive services. Journal of General Internal Medicine 2002;17:458–464. [PubMed: 12133161]

Cornford CS, Morgan M. Elderly people's beliefs about influenza vaccination. British Journal of General Practice 1999;49:281–284. [PubMed: 10736905]

Coyle CP, Santiago MC. Healthcare utilization among women with physical disabilities. Medscape Womens Health 2002;7:2. [PubMed: 12466734]

Department of Health, New York State. Chartbook on disability in New York State, 1998–2000. Albany, NY: New York State Department of Health; 2002.

DeVoe JE, Fryer GE, Phillips R, Green L. Receipt of preventive care among adults: insurance status and usual source of care. American Journal of Public Health 2003;93:786–791. [PubMed: 12721145]

Diab ME, Johnston MV. Relationships between level of disability and receipt of preventive health services. Archives of Physical Medicine and Rehabilitation 2004;85:749–757. [PubMed: 15129399]

Ettner SL. The timing of preventive services for women and children: The effect of having a usual source of care. American Journal of Public Health 1996;86:1748–1754. [PubMed: 9003132]

Fiscella K, Franks P, Doescher MP, Saver BG. Disparities in health care by race, ethnicity, and language among the insured: Findings from a national sample. Medical Care 2002;40:52–59. [PubMed: 11748426]

Flocke SA, Frank SH, Wenger DA. Addressing multiple problems in the family practice office visit. Journal of Family Practice 2001;50:211–216. [PubMed: 11252208]

Fontana SA, Baumann LC, Helberg C, Love RR. The delivery of preventive services in primary care practices according to chronic disease status. American Journal of Public Health 1997;87:1190–1196. [PubMed: 9240111]

Freedman VA, Martin LG, Schoeni RF. Disability in America. Population Bulletin 2004;59:3.

Fried LP, Bandeen-Roche K, Kasper JD, Guralnik JM. Association of comorbidity with disability in older women: The Women's Health and Aging Study. Journal of Clinical Epidemiology 1999;52:27–37. [PubMed: 9973071]

Fryer G, Dovey S, Green L. The importance of primary care physicians as the usual source of healthcare in the achievement of prevention goals. American Family Physician 2000;62:9.

Harwell TS, Moore K, Madison M, Powell-Taylor D, Lundgren P, Smilie JG, et al. Comparing self-reported measures of diabetes care with similar measures from a chart audit in a well-defined population. American Journal of Medical Quality 2001;16:3–8. [PubMed: 11202594]

Hebert PL, Frick KD, Kane RL, McBean AM. The causes of racial and ethnic differences in influenza vaccination rates among elderly Medicare beneficiaries. Health Services Research 2005;40:517–537. [PubMed: 15762905]

Iezzoni LI, McCarthy EP, Davis RB, Harris-David L, O'Day B. Use of screening and preventive services among women with disabilities. American Journal of Medical Quality 2001;16:135–144. [PubMed: 11477958]

Iezzoni LI, McCarthy EP, Davis RB, Siebens H. Mobility impairments and use of screening and preventive services. American Journal of Public Health 2000;90:955–961. [PubMed: 10846515]

Jaen CR, Stange KC, Nutting PA. Competing demands of primary care: a model for the delivery of clinical preventive services. Journal of Family Practice 1994;38:166–171. [PubMed: 8308509]

Jones TF, Ingram LA, Craig AS, Schaffner W. Determinants of influenza vaccination, 2003–2004: shortages, fallacies and disparities. Clinical Infectious Diseases 2004;39:1824–1828. [PubMed: 15578406]

Klingbeil H, Baer HR, Wilson PE. Aging with a disability. Archives of Physical Medicine and Rehabilitation 2004;85(7 Suppl 3):S68–73. [PubMed: 15221734]

Krause JS, Coker J, Charlifue S, Whiteneck GG. Health behaviors among American Indians with spinal cord injury: comparison with data from the 1996 Behavioral Risk Factor Surveillance System. Archives of Physical Medicine and Rehabilitation 1999;80:1435–1440. [PubMed: 10569438]

Lawthers AG, Pransky GS, Peterson LE, Himmelstein JH. Rethinking quality in the context of persons with disability. International Journal for Quality in Health Care 2003;15:287–299. [PubMed: 12930044]

Lieberman DA, Holub J, Eisen G, Kraemer D, Morris CD. Utilization of colonoscopy in the United States: results from a national consortium. Gastrointestinal Endoscopy 2005;62:875–883. [PubMed: 16301030]

Lollar DJ. Public health and disability: emerging opportunities. Public Health Reports 2002;117:131–136. [PubMed: 12356997]

Mac Donald R, Baken L, Nelson A, Nichol KL. Validation of self-report of influenza and pneumococcal vaccination status in elderly outpatients. American Journal of Preventive Medicine 1999;16:173–177. [PubMed: 10198654]

Mandelblatt JS, Gold K, O'Malley AS, Taylor K, Cagney K, Hopkins JS, et al. Breast and cervix cancer screening among multiethnic women: role of age, health, and source of care. Preventive Medicine 1999;28:418–425. [PubMed: 10090871]

Martin LM, Leff M, Calonge N, Garrett C, Nelson DE. Validation of self-reported chronic conditions and health services in a managed care population. American Journal of Preventive Medicine 2000;18:215–218. [PubMed: 10722987]

McGovern PG, Lurie N, Margolis KL, Slater JS. Accuracy of self-report of mammography and Pap smear in a low-income urban population. American Journal of Preventive Medicine 1998;14:201–208. [PubMed: 9569221]

McNeil JM. Disabilities affect one-fifth of all Americans. Census Brief 1997;97:5.

National Heart Lung and Blood Institute. NIH Publication No. 98-3658. Bethesda, MD: National Institutes of Health, US Department of Health and Human Services; 1998. Facts about heart disease and women: Reducing high blood cholesterol.

Nelson DE, Bland S, Powell-Griner E, Klein R, Wells HE, Hogelin G, et al. State trends in health risk factors and receipt of clinical preventive services among US adults during the 1990s. Journal of the American Medical Association 2002;287:2659–2667. [PubMed: 12020301]

Nelson K, Norris K, Mangione CM. Disparities in the diagnosis and pharmacologic treatment of high serum cholesterol by race and ethnicity: Data from the Third National Health and Nutrition Examination Survey. Archives of Internal Medicine 2002;162:929–935. [PubMed: 11966345]

Nosek MA, Howland CA. Breast and cervical cancer screening among women with physical disabilities. Archives of Physical Medicine and Rehabilitation 1997;78(12 Suppl 5):S39–44. [PubMed: 9422006]

Nutting PA, Baier M, Werner JJ, Cutter G, Conry C, Stewart L. Competing demands in the office visit: What influences mammography recommendations? Journal of the American Board of Family Practice 2001;14:352–361. [PubMed: 11572540]

Ramirez A, Farmer GC, Grant D, Papachristou T. Disability and preventive cancer screening: Results from the 2001 California Health Interview Survey. American Journal of Public Health 2005;95:2057–2064. [PubMed: 16195509]

Redelmeier DA, Tan SH, Booth GL. The treatment of unrelated disorders in patients with chronic medical diseases. New England Journal of Medicine 1998;338:1516–1520. [PubMed: 9593791]

Reed, MC.; Hargraves, JL.; Cassil, A. NIH Publication No. 98-3658. Washington, D.C: Center for Studying Health System Change; 2003. Facts about heart disease and women: Reducing high blood cholesterol; p. 1-8.

Research Triangle Institute. SUDAAN user's manual [Version 8.0]. Research Triangle Park, NC: Research Triangle Institute; 2001.

Rimmer JH. Health promotion for people with disabilities: The emerging paradigm shift from disability prevention to prevention of secondary conditions. Physical Therapy 1999;79:495–502. [PubMed: 10331753]

Sambamoorthi U, Findley PA. Who are the elderly who never receive influenza immunization? Preventive Medicine 2005;40:469–478. [PubMed: 15530600]

Scott TL, Gazmararian JA, Williams MV, Baker DW. Health literacy and preventive health care use among Medicare enrollees in a managed care organization. Medical Care 2002;40:395–404. [PubMed: 11961474]

Selvin E, Brett KM. Breast and cervical cancer screening: sociodemographic predictors among White, Black, and Hispanic women. American Journal of Public Health 2003;93:618–623. [PubMed: 12660207]

Stange KC, Flocke SA, Goodwin MA, Kelly RB, Zyzanski SJ. Direct observation of rates of preventive service delivery in community family practice. Preventive Medicine 2000;31:167–176. [PubMed: 10938218]

Stone EG, Morton SC, Hulscher ME, Maglione MA, Roth EA, Grimshaw JM, et al. Interventions that increase use of adult immunization and cancer screening services: a meta-analysis. Annals of Internal Medicine 2002;136:641–651. [PubMed: 11992299]

Sullivan SG, Slack-Smith LM, Hussain R. Understanding the use of breast cancer screening services by women with intellectual disabilities. Sozial- und Praventivmedizin 2004;49:398–405. [PubMed: 15669440]

Thomas J, Lackland D, Taylor K. Disparity between whites and African-Americans in knowledge and treatment of cholesterol. Carolina heart survey. Annals of Epidemiology 2000;10:460. [PubMed: 11018372]

Tumiel-Berhalter LM, Finney MF, Jaen CR. Self-report and primary care medical record documentation of mammography and Pap smear utilization among low-income women. Journal of the National Medical Association 2004;96:1632–1639. [PubMed: 15622694]

US Department of Health and Human Services. Healthy people 2010: Understanding and Improving Health. 2. Washington, D.C: U.S. Government Printing Office; 2000.

US Preventive Services Task Force. Guide to clinical preventive services. 3. 2005.

Verbrugge LM, Merrill SS, Liu X. Measuring disability with parsimony. Disability and Rehabilitation 1999;21:295–306. [PubMed: 10381242]

Waldrop, J.; Stern, MS. Disability status: 2000—Census 2000 brief. Washington, D.C: US Census Bureau; 2003.

Zapka JG, Bigelow C, Hurley T, Ford LD, Egelhofer J, Cloud WM, et al. Mammography use among sociodemographically diverse women: the accuracy of self-report. American Journal of Public Health 1996;86:1016–1021. [PubMed: 8669504]

Zimmerman RK, Raymund M, Janosky JE, Nowalk MP, Fine MJ. Sensitivity and specificity of patient self-report of influenza and pneumococcal polysaccharide vaccinations among elderly outpatients in diverse patient care strata. Vaccine 2003;21:1486–1491. [PubMed: 12615445]

Zorowitz RD, Gross E, Polinski DM. The stroke survivor. Disability and Rehabilitation 2002;24:666–679. [PubMed: 12296982]

Biographies

Wenhui Wei, PhD, is an Associate in the Institute for Health, Health Care Policy and Aging Research at Rutgers, the State University of New Jersey. He is also working full-time as a health outcomes manager at Sanofi-Aventis. His current research focuses on diabetes care, physical disability, and health outcomes.

Patricia A. Findley, DrPH, MSW, LCSW, is an Assistant Research Professor in the School of Social Work at Rutgers, the State University of New Jersey. She is also a Health Science Specialist with the Veterans Administration Health Care System in East Orange, New Jersey. Her current research focuses on physical disability, chronic illness, functional outcomes, cancer survivorship, and women's health issues.

Dr. Usha Sambamoorthi, PhD, is an Adjunct Associate Professor in the Division of Health Systems and Policy, School of Public Health, UMDNJ, New Jersey. She is also the director of Health Outcomes Research, Center for Health Care Knowledge and Management at VANJHCS, New Jersey. Her current research focuses on preventive care, health outcomes, the interaction between mental and chronic illness care and women's health issues.

Table 1

Receipt of recommended clinical preventive services by type and disability status among women (*N* = 3,183) Medical Expenditures Panel Survey, 1999–2002

	Sample *N* and Weighted Percent Receiving Recommended Clinical Preventive Services						Separate Multiple Logistic Regressions on Clinical Preventive Services	
	All Women		Women With Disability		Other Women			
	N	%	*N*	%	*N*	%	AOR for Disability	95% CI
Mammogram within last 2 years (*n* = 2,913)*	2,452	81.0	612	76.6	1,840	82.4	0.69†	0.51–0.95
Pap test within last 3 years (*n* = 3,025)*	2,575	84.4	628	77.0	1,947	86.7	0.64‡	0.48–0.85
Ever had colorectal screening (*n* = 3,132)*	1,041	33.2	340	40.8	701	30.9	1.54‡	1.16–2.04
Influenza immunization within the last year (*n* = 3,137)*	1,268	41.6	392	50.1	876	39.0	1.37‡	1.08–1.73
Cholesterol screening within last 5 years (*n* = 3,073)	2,796	91.3	742	92.6	2,054	90.9	0.74	0.48–1.13

Note. Based on women sampled in 1999–2002 panels 4, 5, and 6 of Medical Expenditure Panel Survey who were aged 51–64 in the baseline year, followed-up for 2 consecutive years, and alive by the end of the follow-up. Figures in parentheses represent total sample size. The sample sizes vary due to missing data. The multiple logistic regressions on each type of preventive services controlled for enrollee's sociodemographic characteristics and medical conditions and included intercept term. Reference group for the disability status are individuals without any disability. All statistical except the sample sizes were adjusted for the complex survey design of MEPS.

Abbreviations: AOR, adjusted odds ratio; CI, confidence intervals.

*Significant group difference ($p < .05$) in receipt of clinical preventive services by disability status.

†Significant effect at 1% in the multiple logistic regressions.

‡Significant effect at 5% level in the multiple logistic regressions.

Table 2

Sample *n* and weighted percent of receipt of recommended clinical preventive services among women with disabilities, Medical Expenditure Panel Survey, 1999–2002

	Mammogram Within Last 2 Years		Pap Smear Within Last 3 Years		Any Colorectal Screening		Influenza Immunization Within Last Year		Cholesterol Screening Within Last 5 Years	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Total	612	76.6	628	77.0	340	40.8	392	50.1	742	92.6
Race/ethnicity[b]										
White	389	76.4	391	76.1	232	42.0	272	52.9	489	93.9
African American	110	76.7	113	77.2	57	38.2	50	38.4	125	88.5
Latino	100	84.2	110	89.1	46	37.4	60	47.1	112	90.2
Others	13	57.6	14	65.6	5	22.1	10	43.1	16	79.7
Age (y)										
51–55	236	73.1	251	77.4	126	38.3	137	46.0	283	89.9
56–60	227	81.7	223	77.1	117	39.5	151	53.6	270	94.4
61–64	149	74.5	154	76.2	97	46.9	104	51.6	189	94.2
Marital status[c]										
Married	299	76.1	309	76.9	190	46.7	194	47.5	372	93.0
Widowed	79	73.1	88	78.0	36	26.9	59	54.7	103	95.2
Separated/divorced	180	79.1	178	77.2	90	39.5	99	51.3	202	90.5
Never married	54	78.0	53	75.4	24	33.2	40	54.8	65	91.9
Education level[c]										
Less than high school	192	72.4	197	73.1	89	30.4	128	47.4	243	93.5
High school	229	78.2	227	75.3	131	41.1	146	51.2	280	93.8
Above high school	151	76.4	164	81.6	98	48.3	93	50.8	175	89.6
Missing	40	85.1	40	82.2	22	47.3	25	52.0	44	94.6
MSA[abd]										
Metro	460	79.8	466	79.7	243	42.2	289	52.6	534	93.3
Rural	152	67.0	162	68.8	97	36.4	103	42.7	208	90.1
Region[d]										
Northeast	90	80.2	92	80.2	43	39.8	66	61.2	107	94.9
Midwest	154	81.4	148	77.8	85	43.9	88	46.3	174	90.9
South	227	71.3	253	77.6	139	42.1	141	43.8	299	93.4
West	141	77.1	135	72.7	73	35.6	97	56.3	162	91.3
Poverty level[ac]										
Poor	129	70.7	141	77.3	60	29.1	86	46.6	159	89.7
Near poor	122	67.1	129	68.7	67	35.4	85	50.2	157	90.0
Middle income	171	79.8	171	76.9	92	41.2	101	50.6	208	94.6
High income	190	82.5	187	81.8	121	49.6	120	51.6	218	93.8
Health insurance coverage[abcde]										
Any private	382	81.3	388	81.4	243	48.6	240	51.7	456	95.2
Public only	193	73.2	194	71.7	83	28.7	131	53.5	230	92.1
Uninsured	37	49.8	46	58.8	14	17.2	21	25.7	56	71.4
Usual source of care[abe]										
PCP	298	78.6	304	77.9	168	41.7	195	53.1	359	94.2
Others	286	79.1	290	79.6	155	41.7	178	49.5	338	93.9
None	27	46.9	33	54.0	16	27.5	18	34.0	44	72.7
Obesity										
Under/normal weight	149	78.0	157	78.0	77	38.8	98	52.0	183	92.1
Overweight	151	75.7	156	80.5	97	48.8	99	50.6	179	92.4
Obese	278	75.4	281	73.9	149	37.0	171	47.1	341	92.7
Missing	34	83.1	34	81.4	17	45.3	24	61.4	39	94.3
Perceived physical health[ab]										
Excellent/very good	123	86.2	129	88.8	72	49.4	67	49.0	138	93.5
Good	178	71.4	177	72.4	95	36.7	123	53.2	215	89.8

	Mammogram Within Last 2 Years		Pap Smear Within Last 3 Years		Any Colorectal Screening		Influenza Immunization Within Last Year		Cholesterol Screening Within Last 5 Years	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Fair/poor	311	75.5	322	74.4	173	39.3	202	48.7	389	93.9
Perceived mental health										
Excellent/very good	264	78.8	277	81.1	154	44.6	163	49.6	309	92.6
Good	218	77.3	216	75.1	108	36.6	140	50.7	268	92.0
Fair/poor	130	71.0	135	71.4	78	39.3	89	50.4	165	93.3

Note. Based on women sampled in 1999–2002 panels 4, 5, and 6 of Medical Expenditure Panel Survey who reported any limitation in 2 consecutive years, were aged 51–64, followed up for 2 consecutive years, and alive by the end of the follow-up. The sample sizes vary due to missing data. Superscripts a, b, c, d, and e denote, respectively, significant subgroup differences ($p < .05$) in receipt of mammogram within last 2 years, Pap smear within last 3 years, any colorectal screening, influenza immunization within the last year, and cholesterol screening with the last 5 years.

Table 3

Separate multiple logistic regressions on receipt of recommended clinical preventive services by type among women with disabilities Medical Expenditure Panel Survey, 1999–2002

	Mammogram Within Past 2 Years		PAP Smear Within Past 3 Years		Ever Received Colorectal Screening		Influenza immunization Within Past Year		Cholesterol screening Within Past 5 Years	
	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
Race/ethnicity										
White	…	…	…	…	…	…	…	…	…	…
African American	1.24	0.68–2.27	1.22	0.68–2.21	1.55‡	0.92–2.62	0.49*	0.30–0.81	0.28*	0.11–0.67
Latino	2.64*	1.32–5.27	4.56*	1.86–11.18	1.58‡	0.93–2.69	0.72	0.41–1.24	0.44‡	0.18–1.08
Others	1.14	0.32–4.03	1.14	0.35–3.68	0.88	0.27–2.90	0.86	0.30–2.47	0.27†	0.08–0.94
Age (y)										
51–55	…	…	…	…	…	…	…	…	…	…
56–60	1.92*	1.18–3.12	0.85	0.51–1.44	1.07	0.72–1.59	1.35	0.90–2.03	1.72‡	0.93–3.19
61–64	1.32	0.72–2.45	0.85	0.47–1.54	1.74†	1.02–2.96	1.27	0.78–2.05	1.45	0.64–3.25
Marital status										
Married	…	…	…	…	…	…	…	…	…	…
Widowed	0.62	0.33–1.15	0.94	0.51–1.73	0.38*	0.20–0.71	1.40	0.80–2.43	1.00	0.39–2.56
Separated/divorced	1.30	0.79–2.15	1.06	0.57–1.99	0.81	0.53–1.25	1.37	0.87–2.17	0.79	0.35–1.78
Never married	1.18	0.55–2.53	0.82	0.34–1.94	0.74	0.38–1.42	1.61	0.85–3.06	1.22	0.37–4.03
Education level										
Less than high school	…	…	…	…	…	…	…	…	…	…
High school	0.95	0.58–1.54	0.89	0.54–1.45	1.28	0.81–2.01	1.02	0.64–1.62	0.66	0.29–1.52
Above high school	0.84	0.47–1.49	1.64	0.84–3.19	2.16*	1.24–3.75	0.93	0.53–1.63	0.36†	0.14–0.92
Missing	1.08	0.38–3.11	0.97	0.32–2.90	1.83	0.88–3.81	0.74	0.31–1.78	0.50	0.09–2.90
MSA										
Metro	…	…	…	…	…	…	…	…	…	…
Rural	0.55*	0.36–0.84	0.57*	0.38–0.85	0.87	0.55–1.38	0.72‡	0.50–1.05	0.44†	0.22–0.89
Region										
Northeast	…	…	…	…	…	…	…	…	…	…
Midwest	1.52	0.78–2.99	0.99	0.54–1.82	1.13	0.61–2.07	0.60‡	0.34–1.08	0.44	0.14–1.34
South	0.97	0.50–1.88	1.13	0.61–2.10	1.16	0.68–1.97	0.60‡	0.36–1.02	0.82	0.27–2.52
West	1.08	0.44–2.64	0.58	0.29–1.17	0.81	0.47–1.42	0.90	0.50–1.60	0.69	0.19–2.53
Poverty level										
Poor	…	…	…	…	…	…	…	…	…	…
Near poor	0.87	0.49–1.55	0.57‡	0.31–1.02	1.25	0.72–2.15	1.30	0.79–2.15	1.29	0.55–3.00
Middle income	1.55	0.84–2.88	0.68	0.35–1.33	1.23	0.73–2.08	1.25	0.73–2.15	2.87‡	0.93–8.86
High income	1.64	0.79–3.39	0.78	0.37–1.68	1.43	0.80–2.56	1.37	0.75–2.50	1.98	0.63–6.24
Health insurance coverage										
Any private	2.90*	1.40–6.01	2.80*	1.31–5.98	4.66*	2.14–10.15	2.71*	1.45–5.09	4.83*	1.98–11.81
Public only	2.84†	1.28–6.27	1.94‡	0.91–4.17	2.21†	1.03–4.76	2.57*	1.27–5.20	4.47*	1.63–12.27
Uninsured	…		…							
Usual source of care										
PCP	4.41*	1.94–10.03	3.10†	1.21–7.93	1.23	0.64–2.33	1.78	0.76–4.17	4.23*	1.46–12.25
Others	4.21*	1.84–9.62	3.55*	1.44–8.76	1.30	0.67–2.53	1.53	0.64–3.69	4.47*	1.85–10.80
None	…		…		…		…		…	
Perceived physical health										
Excellent/very good	…	…	…	…						
Good	0.37*	0.19–0.73	0.35*	0.17–0.74	0.69	0.41–1.16	1.09	0.65–1.82	0.70	0.26–1.86
Fair/poor	0.52‡	0.27–1.02	0.40†	0.18–0.87	0.83	0.47–1.46	0.82	0.46–1.43	1.07	0.37–3.12
Perceived mental health										
Excellent/very good	…	…	…	…	…	…	…	…	…	…

	Mammogram Within Past 2 Years		PAP Smear Within Past 3 Years		Ever Received Colorectal Screening		Influenza immunization Within Past Year		Cholesterol screening Within Past 5 Years	
	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
Good	1.23	0.78–1.94	0.99	0.61–1.59	0.78	0.51–1.18	1.12	0.74–1.71	1.12	0.50–2.51
Fair/poor	0.72	0.40–1.31	0.81	0.47–1.40	0.93	0.56–1.55	1.03	0.61–1.75	1.06	0.40–2.81

Note. Based on women sampled in 1999–2002 panels 4, 5, and 6 of Medical Expenditure Panel Survey who reported any limitation in 2 consecutive years, were aged 51–64 in the baseline year, followed up for 2 consecutive years, and alive by the end of the follow-up. All the regressions are adjusted for the complex survey design of MEPS and include intercept term, the MEPS panels of the respondents, employment status, obesity status, and comorbidities including diabetes, cancer, heart disease, hypertension, asthma, and mental illness.

Abbreviations: AOR, adjusted odds ratios; CI, confidence intervals; PCP, primary care physician

[*] Significant effect in the logistic regression at 1%.

[†] Significant effect in the logistic regression at 5%.

[‡] Significant effect in the logistic regression at 10%.