DOI: 10.1111/j.1475-6773.2008.00853.x
RESEARCH BRIEF

Early Stage Breast Cancer Treatments for Younger Medicare Beneficiaries with Different Disabilities

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Objective. To explore how underlying disability affects treatments and outcomes of disabled women with breast cancer.
Data Sources. Surveillance, Epidemiology, and End Results program data, linked with Medicare files and Social Security Administration disability group.
Study Design. Ninety thousand two hundred and forty-three incident cases of early-stage breast cancer under age 65; adjusted relative risks and hazards ratios examined treatments and survival, respectively, for women in four disability groups compared with nondisabled women.
Principal Findings. Demographic characteristics, treatments, and survival varied among four disability groups. Compared with nondisabled women, those with mental disorders and neurological conditions had significantly lower adjusted rates of breast conserving surgery and radiation therapy. Survival outcomes also varied by disability type.
Conclusions. Compared with nondisabled women, certain subgroups of women with disabilities are especially likely to experience disparities in care for breast cancer.
Key Words. Breast cancer, disability, disparities

Government officials, including the U.S. Surgeon General, and patient advocates have called for including persons with disabilities in treatment disparity studies (U.S. Department of Health and Human Services 2000, 2005). Growing numbers of studies document underuse of routine screening and preventive services among some persons with disabilities, especially screening mammograms among disabled women (Nosek and Howland 1997; Chan et al. 1999; Iezzoni et al. 2000; Chevarley et al. 2006). Studies are also beginning to show important disparities in medical treatments (Caban et al. 2002; McCarthy et al. 2006; Iezzoni et al. 2008). Using data from the 11 Surveillance, Epidemiology, and End Results (SEER) cancer registries merged with Medicare claims, we recently showed that women under age 65 who have

Medicare because of disability and who then develop breast cancer are much less likely than other women to receive recommended treatments and have shorter cancer survival (McCarthy et al. 2006). We did not show, however, that women with disabilities had later stage cancer diagnoses (McCarthy et al. 2007).

Although these findings are provocative, they leave important questions unanswered. Given clinical heterogeneity among disabled Medicare beneficiaries, one important question is whether treatment and survival disparities vary by underlying disability. Persons under age 65 become eligible for Medicare 24 months after first receiving cash benefits from Social Security Disability Insurance (SSDI). To explore whether breast cancer treatments and outcomes differ by disabling condition, we used SEER-Medicare data merged for the first time with information from the Social Security Administration (SSA) on causes of disability.

METHODS

Data Sources

Our methods for identifying women with and without disability (i.e., SSDI/Medicare) are described elsewhere (McCarthy et al. 2006, 2007). Briefly, SEER data include 11 population-based tumor registries, representing 14 percent of the U.S. population (Warren et al. 2002). SEER registries identify cases primarily by reviewing hospital pathology reports and discharge diagnoses; they collect information on patient demographics and tumor characteristics at diagnosis, including primary tumor site, stage, size, histology, tumor grade, lymph node status, and, since 1990, hormone receptor status. SEER records initial treatment (within 4 months of diagnosis from 1973 to 1998, within 12 months of diagnosis after 1998) and generally captures all surgery and radiation therapy (Cooper et al. 2002; Virnig et al. 2002). Registries collect

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chemotherapy information but do not release it because of concerns about incomplete data. SEER tracks vital status annually, obtaining underlying cause of death from death certificates. The linked database contains Medicare enrollment and utilization information for Medicare beneficiaries diagnosed with cancer (Potosky et al. 1993).

SSA (2003) aggregate data indicate that neoplasms caused 9.8 percent of new SSDI disability determinations in 2002. As described elsewhere, we developed an algorithm allowing us to focus exclusively on individuals with Medicare when newly diagnosed with cancer, thus eliminating persons disabled by cancer (McCarthy et al. 2007). When individuals qualify for SSDI, SSA records their primary impairment (i.e., reason persons were "medically determined" disabled); SSA does not release impairment codes to nongovernmental investigators. For our study, officials at SSA, the Centers for Medicare and Medicaid Services (CMS), and the National Cancer Institute (NCI) had their data processing contractor merge SSA "impairment codes" and "diagnosis groups" with our final analytic file, which we provided to them (Iezzoni et al. 2008). To protect confidentiality, we did not have access to these merged files but instead worked with the government contractor to perform analyses using SSA information.

Study Sample

This retrospective cohort study included women ages 21–64 when diagnosed with their first primary breast cancer between January 1, 1988 and December 31, 1999 residing in SEER-11 coverage areas and diagnosed with stage I or II disease as classified by the American Joint Committee on Cancer. As described elsewhere, (McCarthy et al. 2006) we excluded: women with Paget's disease or inflammatory carcinoma; those whose tumor size was classified as widespread or unknown; and women who did not receive surgery (<1 percent). For these analyses, we further excluded 77 women with SSDI/Medicare who did not match with SSA data and therefore were missing information on SSA disability determination. Our final study sample contains 90,243 women under age 65 with early stage breast cancer who received either mastectomy or breast conserving surgery; 2,582 (2.9 percent) had SSDI/Medicare.

Disability Diagnosis Groups

After merging SSA data with our analytic file, the government contractor produced frequency distributions for each "impairment code" (SSA's most granular listing of conditions) and "diagnosis groups" (SSA's groupings of

impairment codes). Very few cases fell into individual impairment codes; many diagnosis groups also had too few cases for separate analysis. Of the 2,582 women with SSDI/Medicare, 658 (25.5 percent) had codes indicating "miscellaneous" ($n = 186$) and "unknown" ($n = 472$) conditions. To bolster sample sizes, we combined some diagnosis groups and present data for four broad conditions with sufficient numbers for analysis (see Table 1 footnotes). Readers may obtain lists of diagnosis groups included in our four conditions upon request.

Breast Cancer Treatment

We used SEER data to identify breast cancer treatments. Our primary outcome of interest was initial surgical treatment for early stage breast cancer, comparing breast conserving surgery with mastectomy. SEER registries recorded initial surgical treatment within 4 months of diagnosis from 1973 to 1998 and within 12 months of diagnosis after 1998. As described elsewhere (McCarthy et al. 2006), we defined breast conserving surgery as segmental mastectomy, lumpectomy, quadrantectomy, tylectomy, wedge resection, nipple resection, excisional biopsy, or partial mastectomy that was not otherwise specified ($n = 46{,}297$). We defined mastectomy as subcutaneous, total (simple), modified radical, radical, extended radical mastectomy, or mastectomy that was not otherwise specified ($n = 43{,}946$).

For the subset of women receiving breast conserving surgery, we studied two additional recommended interventions (NIH Consensus Conference 1991): axillary lymph node dissection; and radiation therapy, which is recommended for women who undergo breast conserving surgery to reduce the risk of local recurrence. SEER collects information on whether persons have contraindications to surgery or refuse radiotherapy. Only 250 (0.5 percent) women with breast conserving surgery refused radiation therapy, and of these, 10 had SSDI/Medicare; we assigned these women to the "no radiotherapy" group.

Survival

We examined survival (all-cause and breast cancer-specific) following diagnosis. We measured survival time as number of days from diagnosis until death or December 31, 2001, whichever came first. Because SEER indicates only the month of diagnoses, we set all diagnosis dates as the first of the month; this might introduce some small error in calculating survival times, but these errors are unlikely to differ systematically between women with and without disabilities. For all-cause mortality, we censored observations of women alive

Table 1: Demographic and Tumor Characteristics by SSDI Status and Disability Group

		*Disability Group**			
Demographic, Registry, Diagnosis Year, and Tumor Characteristics	*Not SSDI*	*Mental Disorders*	*Neurological Conditions*	*Circulatory/ Respiratory*	*Musculo-skeletal*
Number of women	87,661	767	184	306	526
Demographic characteristics					
Age in years: mean (SD)†	50.4 (8.7)	52.5 (7.7)	53.3 (7.4)	58.1 (5.6)	57.1 (6.4)
Race/ethnicity (%)†					
Non-Hispanic white	75.7	66.4	79.9	68.0	65.6
Non-Hispanic black	8.0	20.5	13.0	21.6	19.0
Hispanic	7.0	8.3	3.8	5.6	11.2
Other	9.3	4.8	3.3	4.9	4.2
Marital status (%)†					
Never married	12.6	35.5	20.7	11.8	13.1
Married	68.9	24.1	53.8	46.4	48.7
Widowed	4.7	10.2	7.1	16.7	16.4
Other	13.8	30.3	18.5	25.2	21.8
Tumor registry (%)‡					
Connecticut	11.4	13.3	7.1	11.8	10.8
Hawaii	3.9	3.7	2.2	2.9	2.1
Iowa	8.7	8.3	13.0	8.2	8.8
New Mexico	4.3	4.2	3.8	3.6	5.7
Utah	4.1	4.6	4.4	2.9	4.0
Atlanta	7.7	6.7	6.0	7.8	4.9
Detroit	12.5	16.7	13.6	19.3	14.5
Los Angeles	16.7	17.5	17.4	17.3	16.5
San Francisco/Oakland	13.6	11.3	12.5	11.8	13.3
San Jose/Monterey	5.0	4.0	6.5	3.4	6.5
Seattle/Puget Sound	12.1	9.8	13.6	10.8	12.9
Year of diagnosis (%)†					
1988–1991	22.3	15.4	13.0	21.2	15.2
1992–1995	34.7	34.0	29.4	33.7	34.2
1996–1999	43.0	50.6	57.6	45.1	50.6
Breast tumor characteristics (%)					
Stage‡					
I	51.4	49.9	51.1	55.2	57.8
IIA	31.7	30.1	29.4	29.7	31.2
IIB	17.0	20.0	19.6	15.0	11.0
Lymph nodes†					
Negative	63.2	58.8	61.4	60.1	67.1
Positive	30.2	32.2	27.7	25.5	24.1
Unknown	6.6	9.0	10.9	14.4	8.8
Grade†					
Well-differentiated	11.9	15.4	13.6	12.1	15.8

continued

Table 1. *Continued*

Demographic, Registry, Diagnosis Year, and Tumor Characteristics	*Not SSDI*	*Disability Group**			
		Mental Disorders	*Neurological Conditions*	*Circulatory/ Respiratory*	*Musculo-skeletal*
Moderately differentiated	31.8	33.5	34.2	36.6	31.9
Poorly differentiated	31.7	28.8	31.0	28.8	29.1
Histology					
Ductal	79.0	75.8	75.0	81.1	78.5
Lobular	6.2	6.5	6.0	5.9	5.9
Mixed ductal/lobular	5.8	6.4	8.2	3.9	4.9
Estrogen receptor status[†],[§]					
Positive	53.2	55.8	60.3	57.8	52.7
Negative	20.3	21.4	21.2	18.0	23.8
Progesterone receptor status[†],[§]					
Positive	47.0	51.1	50.0	50.7	45.3
Negative	24.2	23.9	30.4	22.9	28.3

*Mental disorders = mental disorders and mental retardation; neurological = nervous system disorders; circulatory/respiratory = circulatory conditions and respiratory conditions; musculoskeletal = musculoskeletal and connective tissue disorders.

[†] p-value $< .0001$ for comparison across all groups.

[‡] p-value $= .002$ for comparison across all groups.

[§]Receptor status collected starting in 1990.

when follow-up ended ($n = 77{,}048$). We also studied breast cancer-specific deaths, censoring observations of women alive at the end of follow-up or who died from causes other than breast cancer or cancers of common metastatic sites (liver, lung, bone, or brain) ($n = 81{,}201$).

Analysis

All statistical analyses used *SAS* version 9.1 (SAS Institute, Cary, NC). Because our analyses used SEER-Medicare linked with SSA data to examine whether breast cancer treatment and outcomes varied across disability groups, we supplied SAS code to the government contractor, who performed the analyses for us. After internal quality assurance audits, they returned aggregated results (i.e., we did not receive information on individual cases).

Using bivariable analyses, we compared demographic and tumor characteristics at diagnosis by SSDI/Medicare (disability) status. We conducted multivariable logistic regression to examine adjusted associations between disability status and each treatment (surgery, lymph node dissection, radiotherapy) after adjusting for: age at diagnosis (continuous); race/ethnicity

(non-Hispanic white, non-Hispanic black, Hispanic, Asian American/Pacific Islander, other); marital status at diagnosis (married, widowed, never married, other); SEER tumor registry; year of diagnosis; tumor size (continuous, in cm); grade (well differentiated, moderately differentiated, poorly/undifferentiated); histology (ductal, lobular, mixed ductal/lobular); estrogen receptor status (positive, negative, unknown); and progesterone receptor status (positive, negative, unknown). In analyses examining all women combined, we also adjusted for stage at diagnosis. In addition, we conducted analyses stratifying women by stage at diagnosis, speculating that associations might differ for women with stage I versus stage IIB disease. In each model, we compared women with and without SSDI/Medicare. We converted odds ratios to relative risks (RR) with 95 percent confidence intervals (Flanders and Rhodes 1987).

We conducted multivariable Cox proportional hazards regression to estimate adjusted relative hazard ratios for each mortality outcome (all-cause, cancer-specific). We fit three separate proportional hazards models for each mortality outcome. Model 1 estimated the unadjusted relative hazard ratio comparing women with and without SSDI/Medicare. Model 2 adjusted this relative hazard ratio for age at diagnosis (continuous), race/ethnicity, marital status, tumor registry, year of diagnosis, stage at diagnosis (overall model only), tumor size (continuous), tumor grade, histology, and hormone receptor status. Model 3 further adjusted the relative hazard ratio for treatment (breast-conserving surgery only, mastectomy only, breast-conserving surgery plus radiotherapy, and mastectomy plus radiotherapy). With large sample sizes such as those in our study, the test for the proportional hazards assumption almost always yields a significant p-value, which implies that the assumption of the proportionality of hazards is invalid. Therefore, we examined the assumption of proportionality by graphically comparing women with and without disabilities (Lee 1992). Specifically, we plotted the $\log(-\log(S(t)))$ versus time and found the distance between these two curves remained relatively constant throughout the study period; this suggests that the assumption of proportional hazards was reasonable for our models. We present adjusted relative hazard ratios (aHR) and 95 percent CI: aHR $>$ 1.00 indicates shorter survival times for disabled compared with nondisabled women.

RESULTS

Women with disabilities (SSDI/Medicare) differed importantly from nondisabled women (Table 1): they were older and more likely to be non-Hispanic

black and not married at the time of diagnosis. Distributions across race and ethnicity, marital status, and tumor characteristics sometimes differed by disability group. For example, women with neurological conditions were most likely to be white and married. Among women with musculoskeletal conditions, 57.8 percent had stage I disease, compared with 49.9 percent of women with mental disorders.

Treatments

Table 2 shows the percent of women receiving breast conserving surgery (BCS), as well as the adjusted relative risks of receiving BCS for women by disability group compared with nondisabled women. While women with circulatory/respiratory conditions and musculoskeletal conditions obtained BCS at similar rates as nondisabled women, those with mental disorders and neurological conditions were much less likely to have BCS when diagnosed with stage I or IIA disease.

For women receiving BCS, Table 3 shows the percent and relative risks of receiving axillary node dissections and radiotherapy. Only women with circulatory/respiratory conditions had much lower adjusted relative risks of receiving axillary node dissections than nondisabled women. In contrast, ad-

Table 2: Receipt of Breast Conserving Surgery by SSDI Status and Disability Group

		*Disability Group**			
Population by Tumor Stage	*Not SSDI*	*Mental Disorders*	*Neurological Conditions*	*Circulatory/ Respiratory*	*Musculoskeletal*
Percent with breast conserving surgery[†]					
All women	51.5	43.8	41.9	46.4	53.0
Stage I	62.2	54.3	53.2	55.6	63.5
Stage IIA	46.0	35.9	33.3	39.6	42.1
Stage IIB	29.5	29.4	25.0	26.1	29.3
Adjusted relative risk (95% CI)[‡]					
All women	1.00	0.80 (0.74, 0.87)	0.77 (0.66, 0.91)	0.87 (0.77, 0.98)	0.95 (0.88, 1.03)
Stage I	1.00	0.80 (0.73, 0.88)	0.81 (0.66, 0.98)	0.88 (0.77, 1.00)	0.96 (0.88, 1.05)
Stage IIA	1.00	0.75 (0.63, 0.89)	0.68 (0.47, 0.99)	0.83 (0.64, 1.06)	0.93 (0.78, 1.10)
Stage IIB	1.00	0.91 (0.71, 1.17)	0.83 (0.47, 1.45)	0.95 (0.61, 1.50)	0.96 (0.65, 1.42)

*See Table 1 for definition of disability groups.

[†]Other women received mastectomy.

[‡]Adjusted for: age at diagnosis (continuous), race/ethnicity, marital status, tumor registry, year of diagnosis, stage at diagnosis (only the model of all women combined), tumor size (continuous), histology, grade, estrogen receptor status, and progesterone receptor status.

Table 3: For Women with Breast Conserving Surgery, Receipt of Axillary Node Dissection and Radiation Therapy by SSDI Status and Disability Group

		*Disability Group**			
Receipt of Service	*Not SSDI*	*Mental Disorders*	*Neurological Conditions*	*Circulatory/ Respiratory*	*Musculoskeletal*
Axillary node dissection					
Percent receiving axillary dissection (%)	89.9	84.8	83.1	72.5	88.5
Unadjusted relative risk (95% CI)	1.00	0.94 (0.90, 0.99)	0.92 (0.83, 1.02)	0.80 (0.73, 0.89)	0.98 (0.94, 1.03)
Adjusted relative risk (95% CI)†	1.00	0.97 (0.93,1.01)	0.93 (0.84, 1.02)	0.87 (0.80, 0.94)	1.00 (0.97, 1.04)
Radiation therapy					
Percent receiving radiation therapy (%)	81.6	70.9	70.3	70.8	81.2
Unadjusted relative risk (95% CI)	1.00	0.87 (0.81, 0.93)	0.87 (0.75, 1.00)	0.87 (0.78, 0.97)	0.99 (0.94,1.05)
Adjusted relative risk (95% CI)	1.00	0.93 (0.88, 0.98)	0.85 (0.73, 0.98)	0.88 (0.79, 0.97)	0.98 (0.93, 1.04)

*See Table 1 for definition of disability groups.

†Adjusted for: age at diagnosis (continuous), race/ethnicity, marital status, tumor registry, year of diagnosis, stage at diagnosis, tumor size (continuous), histology, grade, estrogen receptor status, and progesterone receptor status.

justed relative risks for radiation therapy fell significantly below 1.00 for women with mental disorders, neurological conditions, and circulatory/respiratory disabilities.

Survival

Women with mental disorders and circulatory/respiratory conditions had much higher cancer-specific mortality rates than nondisabled women, although statistically significant differences disappeared for women with mental disorders following adjustment (Table 4). All-cause mortality rates, however, remained significantly higher for women within all four disability groups, even after adjusting for demographic and tumor characteristics and treatment differences (Table 4).

DISCUSSION

Not surprisingly, as suggested by their much higher all-cause mortality rates, women with SSDI/Medicare who develop breast cancer likely carry a much

Table 4: Cancer-Specific and All Cause Mortality for Selected Disability Categories

		*Disability Group**			
Predictive Model	*Not SSDI*	*Mental Disorders*	*Neurological Conditions*	*Circulatory/ Respiratory*	*Musculoskeletal*
Hazards ratios, adjusted as indicated (95% CI)					
Cancer-specific mortality[†]					
Unadjusted	1.0	1.28 (1.04, 1.57)	1.35 (0.89, 2.05)	1.69 (1.24, 2.31)	1.05 (0.78, 1.40)
Adjusted for demographic and tumor characteristics	1.0	1.20 (0.98, 1.47)	1.33 (0.87, 2.02)	1.49 (1.09, 2.04)	0.98 (0.73, 1.32)
Adjusted further for axillary node dissection, radiotherapy	1.0	1.17 (0.95, 1.43)	1.31 (0.86, 2.00)	1.49 (1.09, 2.04)	1.00 (0.74, 1.34)
All cause mortality					
Unadjusted	1.0	1.88 (1.63, 2.17)	2.90 (2.26, 3.72)	4.32 (3.67, 5.09)	2.03 (1.70, 2.42)
Adjusted for demographic and tumor characteristics	1.0	1.63 (1.41, 1.88)	2.61 (2.04, 3.35)	3.29 (2.78, 3.88)	1.65 (1.38, 1.97)
Adjusted further for axillary node dissection, radiotherapy	1.0	1.58 (1.37, 1.83)	2.57 (2.00, 3.29)	3.27 (2.77, 3.86)	1.66 (1.39, 1.98)

*See footnotes to Table 1 for details.

[†]Includes deaths from breast cancer and cancers in common metastatic sites: liver, lung, bone, brain.

heavier burden of underlying health problems than do other women. However, breast cancer experiences—treatment and outcomes—among women with versus without disabilities varied among the four disabling conditions. For stages I and IIA disease, women with mental health problems and mental retardation, along with women with neurological conditions, were significantly less likely than nondisabled women to receive breast conserving surgery, as well as the radiotherapy required to prevent local recurrence of their tumors. Women with circulatory and respiratory disabilities were significantly less likely than women without disabilities to receive axillary node dissection and radiotherapy following BCS, which might reflect a variety of possibilities including patient preferences and substandard quality of care.

Understanding the causes of these differences between women with and without disabilities, as well as across disabilities, will require further study. Different types of disabilities might affect women's treatment options, preferences, and choices. For instance, women who rely on their arms for mobility by self-propelling manual wheelchairs or using walkers or crutches may worry that mastectomy could compromise arm function. Extensive axillary lymph

node procedures can produce lymphedema and other complications that compromise upper extremity function. Even if women prefer breast conserving surgery, physical impairments could prevent the radiotherapy required to prevent local recurrences. Being unable to lie flat, remain still, and/or adequately abduct the arm pose contraindications to radiation therapy (Caban et al. 2002).

Compared with other disability groups, women with musculoskeletal disabilities—probably primarily arthritis and back problems—appear to have treatments and outcomes most similar to nondisabled women. Women with musculoskeletal disorders do differ substantially demographically from nondisabled women, with the highest percentage of Hispanic and large numbers of non-Hispanic black women compared with the other subpopulations. But they also have the highest percentage with stage I disease, 6.4 and 7.9 percentage points higher than for nondisabled women and women with mental disabilities, respectively. One possible explanation is that women with musculoskeletal disabilities have Medicare coverage and therefore can afford physician visits, while some unknown fraction of nondisabled women lack health insurance and do not receive routine care. Perhaps discussing musculoskeletal conditions requires less time than other disabling conditions, leaving physicians and patients more time to perform preventive services, like breast exams, and discuss screening tests, like mammograms. Clearly, this speculation requires further investigation.

Although mastectomy and breast conserving surgery are equivalent with respect to survival (NIH Consensus Conference 1991), the relatively low rates of breast conserving surgery observed among women with mental health/mental retardation disorders raise interesting questions. A small body of literature has explored various issues relating to breast cancer in this population. Women with psychiatric disabilities might possibly have higher rates of breast cancer, perhaps related to medications or hormonal causes, although evidence is contradictory (Halbreich, Shen, and Panaro 1996; Lokugamage et al. 2006). Research also seems inconclusive but suggests that women with mental health problems might receive mammograms less often than other women (Owen, Jessie, and De Vries Robbe 2002; Lasser et al. 2003; Sullivan et al. 2003; Friedman et al. 2005; Kahn et al. 2005). Lower rates of mammography could result from a variety of causes, but might raise concerns about whether these women would adhere to demanding radiotherapy schedules or receive adequate follow-up care if BCS were performed. Little information is available specifically about breast cancer treatment decisions for this population. It is possible that certain mental health and cognitive developmental conditions

might affect women's decision-making capacity or their abilities to weigh different treatment options. Investigations of decision-making for breast cancer treatment in general note that women's concerns about their appearance play a role, although follow-up studies have produced contradictory findings about associations between surgery choices and women's long-term body image, quality of life, sexual functioning, and other psychosocial outcomes (Ganz et al. 1992; Moyer 1997; Curran et al. 1998; Nold et al. 2000; Arora et al. 2001; Nissen et al. 2001; Henson 2002; Figueiredo et al. 2004). Physical appearance may prove particularly complex for women with mental health problems or mental retardation. Some clinicians may have stigmatizing views regarding sexuality of these women, which could potentially affect their treatment recommendations. Studies highlight the crucial role of patient–clinician communication, including the extent of interaction and shared decision making, in treatment choices for women with breast cancer (Katz et al. 2005; Lantz et al. 2005; Katz and Hawley 2007), but this issue has been little explored for women with disabilities. The forced sterilization of disabled women, especially those with developmental disabilities and mental retardation, provides a troubling historical backdrop to these attitudes (Asch and Fine 1988).

Our database did not contain clinical information about women with and without SSDI/Medicare that might independently affect treatment choices and predict poor prognosis (e.g., pulmonary function, smoking history, comorbid illness). The data also did not indicate patients' preferences or clinicians' treatment recommendations; we also lacked information on adjuvant chemotherapy, which certainly can affect survival. Although the SSA data provide useful insight into underlying disabling conditions, small numbers of cases and frequent missing or clinically imprecise data limited this effort. Our findings may not generalize to women with disabilities who do not apply or qualify for SSDI and Medicare, for whatever reason. In particular, the data do not identify women receiving only Supplemental Security Income (SSI), the income support program for persons with disabilities who are poor or have not paid sufficient payroll taxes; nationwide estimates suggest that <2.5 percent of working-age persons get SSI (McCarthy et al. 2007). Individuals with SSI immediately receive Medicaid coverage. Impoverished SSI recipients and low income or uninsured persons with disabilities who have not yet applied for disability benefits face financial barriers to accessing health care.

Despite these limitations, this study raises questions about the care of specific groups of disabled Medicare beneficiaries under age 65 who develop early stage breast cancer. Disparities in treatments between women with and without disabilities appear to vary across disabling conditions. Many factors

could account for these differences, including clinical considerations and patients' preferences. Given that women with mental health conditions and mental retardation appear especially disadvantaged, questions arise about whether stigmatized attitudes among providers and other caregivers might affect their access to good quality care, particularly around adjuvant radiation following breast conserving surgery. Additional research must investigate sources of these treatment disparities to ensure that women with disabilities receive care that respects their preferences and maximizes their quality of life.

ACKNOWLEDGMENTS

This study used the linked SEER-Medicare database. The interpretation and reporting of these data are the sole responsibility of the authors. The authors acknowledge the efforts of several groups responsible for the creation and dissemination of the Linked Database, including the Applied Research Program, Division of Cancer Control and Population Sciences, National Cancer Institute (NCI); the Office of Information Services, and the Office of Research, Development, and Information, Centers for Medicare and Medicaid Services (CMS); Information Management Services, Inc.; and the Surveillance, Epidemiology, and End Results Program Tumor Registries.

This research involved creation of a new database, when Social Security Administration (SSA) disability determination data were linked to the SEER-Medicare files. We are grateful to Joan Warren from NCI, Gerald F. Riley from CMS, and Joel Packman from SSA for supporting this effort. We also thank staff at CHD Research Associates and Fu Associates, particularly LeAnn Weaver and Celia Hsu Dahlman for their meticulous assistance in data analysis.

Funding Source: The National Cancer Institute funded this research (R01 CA100029).

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SUPPLEMENTARY MATERIAL

The following material is available for this article online:

Appendix SA1: Author Matrix.

This material is available as part of the online article from: This material is available as part of the online article from: http://www.blackwell-synergy.com/doi/abs/10.1111/j.1475-6773.2008.00853.x (this link will take you to the article abstract).

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