

The impact of depression as a cancer comorbidity: rates, health care utilization, and associated costs

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Background: The prevalence of concomitant depression among cancer survivors is not well established, although half of those diagnosed with cancer are reported to experience depression at some stage during the cancer experience.

Objectives: To establish rates of diagnosed depression in a cohort of nonelderly adult cancer survivors by cancer site, to characterize those with diagnosed depression, and to assess the impact of diagnosed depression on patterns of health care utilization and costs.

Methods: Medical and pharmacy claims data on military health care beneficiaries were used to develop a cohort of survivors across all cancer sites. Selected cases were diagnosed with and treated for cancer in fiscal years 2006-2007, and had at least 1 health care claim each subsequent year through fiscal year 2010 to ensure survival of at least 2 years. All cancer sites were included except those for nonmelanoma skin cancer. Fiscal year 2009 was used as the index year for determining annual health care utilization and costs. Bivariate and regression analyses were used.

Results: Across the cohort of 11,014 cancer survivors, 12.6% had a comorbid diagnosis of depression at the time of or after a cancer diagnosis. The highest rates of diagnosed depression occurred in those with cancers of the esophagus, pancreas, ovary, or bronchus, lung, or other respiratory organ; and were associated with female sex, single marital status, and enlisted sponsor rank. Survivors who were diagnosed with depression had significantly higher health care utilization for inpatient and outpatient services, more medication prescriptions, and higher annual costs.

Limitations: Due to the nature of claims data, we were unable to ascertain cancer stage or phase of illness. In this analysis, we did not include the presence of comorbidities, history of preexisting depression, or health system factors, all of which may impact the rate of depression among cancer survivors.

Conclusions: The findings suggest the importance for the Military Health System, as well as other health care systems, to address the mental health needs of cancer survivors and the fiscal efficiencies of cancer care.

Distress should be recognized, monitored, documented, and treated promptly at all stages of disease and in all settings.

— National Comprehensive Cancer Network

Depression has long been recognized as a common comorbid condition among individuals who have been newly diagnosed with and treated for cancer. The prevalence

of concomitant depression among cancer survivors is not well established, although half of those diagnosed with cancer are reported to experience depression at some stage in the cancer experience.¹ In the general population, which includes individuals diagnosed with cancer, the prevalence of depression in 2006 was estimated to be 8.7%, with higher rates observed in southern states.² Hence, we would expect rates among cancer patients to be at least that percentage, although our literature review finds that rates of cancer-related depression are chiefly a function of data sources (eg, self-reports, medical record abstraction, claims data, interviews, and standardized measures), sampling methods (randomized controlled vs convenience sampling), criteria for subject inclusion (eg, exclusion of indi-

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viduals with a history of mental illness), and medical or sociodemographic characteristics of study participants.

Among studies that have used psychiatric interviews to establish rates of mood disorders in palliative care settings, the average rate of all types of depression is 24.5% across all cancer sites.³ The rates of clinical depression reported in studies that used standardized measures of psychological distress are highly variable. A recent study using an oncology-specific screening measure found rates of clinical depression ranging from 5.5% (in men with prostate cancer) to 27.9% (in women with lung cancer).⁴ Rates of depressive symptoms may be even higher among women undergoing initial treatment for breast cancer; more than 32% of a large cohort of breast cancer patients displayed depressive symptoms, as measured by a standardized depression scale.⁵ Culture and the selected assessment tool may also influence rates of depression.⁶ Nearly 40% of adult cancer patients in Italy were identified as depressed via the Hamilton Rating Scale–Depression.⁷ By comparison, 66% of adult oncology outpatients in Pakistan were found to have depression, as assessed by the Aga Khan University Anxiety and Depression Scale,⁸ and 28% of patients in Nepal with nonadvanced cancer were found to be depressed via the General Health Questionnaire.⁹ In the United States, linked data from the Medical Expenditure Panel Survey and the National Health Interview Survey found a 10% rate of depression rate among cancer survivors aged from 25 to 64 years, twice the rate of those without a cancer history.¹⁰

There is no agreement among investigators as to which sociodemographic and health-related factors are associated with depression among cancer survivors. Nevertheless, higher levels of depression seem to be more common among inpatients; younger survivors;^{5,8,11} women;¹² those with lower socioeconomic status,¹³ higher symptom burden,¹⁴ presence of posttraumatic stress disorder;¹⁵ stage of disease;¹⁶ and phase of treatment or illness experience.¹⁷ For lung cancer patients, the extent of depression is also related to perceived stigma¹⁸ and poor quality of life.¹⁹

Depression as a comorbidity among individuals with a history of cancer is of particular interest to health care insurers or programs that administer health care, including the Military Health Service. As with other chronic illnesses,²⁰ mental health comorbidity may increase health care expenditures in all phases of cancer care. The extra financial burden of comorbid depression in an oncology population, however, is unknown. Here, we examine the rates of diagnosed depression among nonelderly adult cancer survivors in a population of military beneficiaries, then characterize those most likely to have this comorbidity, and assess the impact of this comorbidity with respect to patterns of health care utilization and costs.

Methods

Data source

Since 1999, data on military health care beneficiaries have been stored in the Military Data Repository (MDR), the nation's largest and most complete repository of military health care utilization. Included in these data are beneficiary claims for health care encounters, and pharmacy, laboratory, radiology, and dental services. The MDR contains data associated with care provided in military and civilian facilities, inpatient and outpatient settings, and emergency departments. In short, the MDR captures health care utilization across the entire system, which allowed us to identify individuals who had been diagnosed with and treated for cancer. We linked these data with other military databases to obtain demographic data using personal identifiers in accordance with Health Insurance Portability and Accountability Act regulations.

Sample

The beneficiaries were eligible for study inclusion if they had at least 1 health care service record in fiscal years (FY) 2006 through 2007 (ie, between October 1, 2005, and September 30, 2007) that had been indicative of a newly diagnosed cancer, and also had at least 1 health care service record in each fiscal year through FY 2010 (September 30, 2010). Beneficiaries who had no health care claims in FY 2010 were assumed to have died and were excluded from this cancer cohort. Thus, all beneficiaries included in the cohort survived at least 2 years after the conclusion of their initial cancer treatment. All of the selected beneficiaries were at least 18 years of age at the beginning of FY 2006 and, to avoid loss of claims data to Medicare, 64 years or younger as of the beginning of FY 2010. We used the Agency for Healthcare Research and Quality clinical classification schema to identify cancer sites, excluding nonmelanoma skin cancer. If there was more than 1 cancer diagnosis, then the beneficiary was categorized based on the first cancer diagnosis. We used FY 2006 and FY 2007 data as the baseline period to identify individuals who received initial cancer treatment based on International Classification of Diseases, 9th revision (ICD-9) treatment and CPT (Current Procedural Terminology) codes. Beneficiaries were excluded if there was no claim for cancer treatment in FY 2006 or FY 2007, or whose initial cancer treatment extended into FY 2008. Bone marrow transplant was considered initial cancer treatment for acute myeloid leukemia, acute lymphoid leukemia, and chronic myeloid leukemia, but not for chronic lymphoid leukemia or any other cancers. Chemotherapy administered within 6 months of the cancer diagnosis was considered initial chemotherapy treatment.

FY 2009 was used as the index year to assess annual costs and health care utilization.

Statistical analysis

We used descriptive statistics to characterize the cancer cohort, and logistic regression analysis to identify sociodemographic predictors (age group, sex, marital status, beneficiary category, and rank of military sponsor) that were associated with the odds of having a diagnosis of depression in FY 2009. We used t-tests to compare health care utilization of beneficiaries with and those without a comorbid depression. Economic analysis was done by summing all inpatient, outpatient, laboratory, radiology, and pharmacy claims in FY 2009.

Definitions

Depression was defined as 1 or more inpatient stay or outpatient encounter with a diagnosis of depression, in any position, during the observation year (FY 2009). The following ICD-9 codes were used to identify depression: 296.2, major depressive disorder, single episode; 296.3, major depressive disorder, recurrent episode; 298.0 depressive type psychosis; 300.4, neurotic depression; 309.1, prolonged depressive reaction; and 311, depressive disorder, NOS (not otherwise specified).

Health care utilization was defined as number of inpatient stays, length of inpatient stays, number of outpatient visits, and total number of unique medication prescription-dispensing events independent of medication quantity or dosage. Health care cost was defined as the total cost to the Department of Defense (DoD), that is, the amount reimbursed or paid to the provider. Costs incurred by the patient or covered by other health insurance were not included.

This study was approved by the TRICARE Management Activity Institutional Review Board Waiver Authority, and the TRICARE Management Activity Privacy and Civil Liberties Office.

Results

Of the total 11,014 beneficiaries included in the FY 2006-2007 cohort, 46.2% were aged from 55 to 64 years, 56.0% were women, 82.2% were military retirees or family members of military retirees, and 29.1% were current or former officers or families members of an officer (Table 1). The number and corresponding percentages of patients with depression for each cancer type is shown in Table 2. For all cancer sites, the overall rate of comorbid depression was 12.6%. From highest to lowest, highest rates of depression were found among beneficiaries with cancers of the esophagus, pancreas, ovary, or bronchus, lung or other respiratory organ; the lowest rates were found for cancers of the brain and nervous system, prostate, bladder, and testis.

TABLE 1 Number and percentage of cancer survivors, by demographic characteristics as of October 1, 2008

Sample characteristics	No. of survivors	%
Total	11,014	100.0
Sex		
Male	4,849	44.0
Female	6,165	56.0
Age group, y		
18-24	70	0.6
25-34	577	5.2
35-44	1,551	14.1
45-54	3,723	33.8
55-64	5,093	46.2
Marital status		
Single	858	7.8
Married	5,148	46.7
Unknown	5,008	45.5
Beneficiary category		
Active duty/guard/reserve member	878	8.0
Active duty/guard/reserve member dependant	1,078	9.8
Retirees and retiree dependants	9,058	82.2
Sponsor rank ^a		
Enlisted	7,802	70.8
Officer	3,210	29.1

Abbreviations: no., number; y, years.

^aTwo missing values for the military rank of the military sponsor.

In all, 3 sociodemographic factors—being a woman (adjusted odds ratio [AOR; men], 2.079; 95% confidence interval [CI], 1.731-2.496), being unmarried (AOR [married], 0.775; 95% CI, 0.617-0.973), and having an enlisted sponsor rank (AOR [officer], 0.836; 95% CI, 0.735-0.952)—increased the odds of having been diagnosed for depression since the cancer diagnosis. Age group and beneficiary category were nonsignificant in the logistic regression analysis (Table 3).

For all cancer sites, all indices of health care utilization and FY 2009 cost were significantly different between beneficiaries with and without comorbid depression (Table 4). On average, the addition of depression as a comorbid condition cost \$8,400 more annually than the costs for individuals without a comorbid depression. Separate analyses by cancer site for beneficiaries found the same pattern, with higher costs incurred by those with comorbid depression.

Discussion

Our study appears to be the first to use claims data to document the extent and impact of comorbid depression among nonelderly adults within 3 years of completing initial cancer treatment. Not unexpectedly, cancer sites with high mortality rates were associated with higher rates of diagnosed depression. This finding is well supported by previous research, which documents higher rates of depression among those with advanced, terminal conditions.^{3,21,22} Although sociodemographic factors have not consistently correlated with depression among cancer survivors,³ our findings indicate a modest protective effect for men, those who are married, and those with officer rank of the sponsor, the latter variable serving as a proxy for income and educational level. Elsewhere, unmarried status²³ and lower income and less education have been related to more depressed mood in populations of cancer survivors.^{13,24}

Overall, our total rate of depression is slightly higher than results based on national surveys (12.6% and 10%, respectively).¹⁰ In comparing our findings by cancer site, our rates of diagnosed depression are lower than those reported elsewhere for some sites. For example, the rates of depression among patients with head and neck cancer have been reported elsewhere as 19% after diagnosis²⁵ and 31% after treatment;¹⁷ our rate is 14.5%. A review of studies that examined the rates of depression among adults with cerebral glioma found a median frequency of 15% based on clinical interviews; our rate for beneficiaries with brain or nervous systems cancer was 7.5%. These differential rates are likely due to the use of systematic mood assessments in these comparative studies, as well as the timing of assessments. Among our cohort cases with breast cancer, however, the rate of 15.9% for diagnosed depression is nearly

TABLE 2 Number and percentage of cancer survivors, total and with a diagnosis of depression in FY 2009, by cancer site

Cancer site	Cancer survivors		Diagnosed with depression ^a	
	No. of survivors	%	No.	%
Total for all cancer sites	11,014	100.0	1,389	12.6
Esophagus	20	0.2	5	25.0
Pancreas	39	0.4	8	20.5
Ovary	168	1.5	29	17.3
Bronchus, lung, and other respiratory organs	234	2.1	40	17.1
Malignant neoplasm without site specification	53	0.5	9	17.0
Breast	2,851	25.9	453	15.9
Secondary malignancy of lymph nodes	95	0.9	15	15.8
Cancer; other and unspecified primary	97	0.9	15	15.5
Uterus	267	2.4	41	15.4
Head and neck	380	3.5	55	14.5
Leukemias	118	1.1	17	14.4
Non-Hodgkin lymphoma	418	3.8	59	14.1
Thyroid	801	7.3	112	14.0
Liver and intrahepatic duct	22	0.2	3	13.6
Kidney, renal pelvis, and other urinary organs	345	3.1	46	13.3
Rectum and anus	243	2.2	32	13.2
Colon	468	4.2	61	13.0
Multiple myelomas	56	0.5	7	12.5
Hodgkin disease	115	1.0	14	12.2
Melanomas of skin	1,177	10.7	135	11.5
Cervix	201	1.8	23	11.4
Stomach	35	0.3	4	11.4
Bone and connective tissue	144	1.3	16	11.1
Other GI organs, peritoneum	55	0.5	6	10.9
Other female genital organs	101	0.9	11	10.9
Brain and nervous system	160	1.5	15	9.4
Prostate	1,967	17.9	135	6.9
Bladder	191	1.7	12	6.3
Testis	190	1.7	11	5.8
Other male genital organs	3	0.0	0	0.0

Abbreviations: FY, fiscal year; GI, gastrointestinal; no., number.

^aOne or more coded diagnosis of depression during FY 2009 based on ICD-9 diagnosis code of 196.2, 296.3, 298.0, 300.4, 309.1, or 311.

identical to the rate of 16% found among breast cancer survivors treated at a large cancer center.²⁶

Claims data have significant limitations in the study of comorbid conditions among cancer survivors, the most important being the lack of cancer stage. Although similar studies in elderly patients commonly link Medicare and the National Cancer Institute Surveillance Epidemiology and End Results (SEER) data to obtain cancer stage, at least

TABLE 3 Adjusted odds ratios and 95% confidence intervals for the likelihood of a diagnosis for depression in FY 2009

Sample characteristics	No. of survivors	Likelihood of diagnosis for depression	
		AOR	95% CI
Sex			
Male	4,849	ª	ª
Female	6,165	2.079	(1.731-2.496)
Age			
	11,014	0.997	(0.991-1.003)
Marital status			
Single	858	ª	ª
Married	5,148	0.775	(0.617-0.973)
Unknown	5,008	0.901	(0.717-1.132)
Beneficiary category			
Active duty/guard/reserve member	878	ª	ª
Active duty/guard/reserve member dependant	1,078	1.138	(0.850-1.524)
Retirees and retiree dependants	9,058	0.973	(0.763-1.242)
Sponsor rankª			
Enlisted	7,802	ª	ª
Officer	3,210	0.836	(0.735-0.952)

Abbreviations: AOR, adjusted odds ratio; FY, fiscal year.
ªTwo missing values for the military rank of the military sponsor.

TABLE 4 Annual FY 2009 health care utilization and cost for all cancer survivors, with and without a diagnosis of depression in FY 2009

FY 2009 health care utilization and cost	Not diagnosed with depression	Diagnosed with depression	P value
Total number of survivors	9,625	1,389	—
Inpatient Services			
Mean number of stays (SD)	0.12 (0.44)	0.41 (0.95)	<.05
Mean number of bed days (SD)	0.64 (4.30)	3.15 (14.39)	<.05
Outpatient services			
Mean number of visits (SD)	18.69 (18.29)	33.66 (26.84)	<.05
Outpatient pharmacy			
Mean number of prescriptionsª (SD)	24.46 (23.51)	45.28 (33.73)	<.05
Cost to the DoD, US dollars ^b			
Total cost	74,381,036	22,518,741	
Mean cost per survivor (SD)	7,728 (13,104)	16,212 (30,874)	<.05

Abbreviations: DoD, Department of Defense; FY, fiscal year; SD, standard deviation.
ªTotal number of unique dispensing events independent of medication quantity or dosage. ^b Does not include costs incurred by the patient or covered by other health insurance.

70% of our retired military population live in states without SEER registries. The DoD maintains a cancer registry for individuals who have been diagnosed and treated at military treatment facilities, a population that represents about 15%

depression are detected and treated before symptoms progress to major or prolonged depression. Our findings suggest that DoD survivors who might benefit most from psychological screening and intervention are women, are unmarried

20% of DoD beneficiaries with cancer. Thus, short of chart audits or personal interviews, we were not able to determine what percentage of our cohort was in the terminal phase of illness. Previous research has shown that comorbidities are associated with higher health care utilization and higher costs among elderly cancer survivors who receive end-of-life care.²⁷ Similarly, those with metastatic disease are likely to incur higher costs than are those with early-stage disease.²⁸ In the present analysis, we also did not include other comorbid medical conditions or metastatic status, both of which may contribute to psychological distress and higher health care utilization and costs. Furthermore, no data in this analysis were collected on preexisting mental health conditions, on who diagnosed depression (oncologist, primary-care physician, or mental-health professional), on the type of health care system where patients were treated (community hospital, cancer center, or military treatment facility), or on geographic location (state or region). These variables are being examined in subsequent analyses.

Despite its limitations, our study documents the costs borne by the Military Health System when depression is and is not a comorbidity among cancer survivors. The significantly higher health care utilization observed across and within cancer sites when depression is present suggests that psychological distress is an important contributor to the nearly \$125 billion spent on cancer care in the United States.²⁹ Although this hypothesis is untested, cost savings to health care systems might be realized if symptoms of

ried, or are diagnosed with cancers of the esophagus; pancreas; ovary; bronchus, lung, or other respiratory organ; breast; or uterus.

Caution is needed in generalizing our results to the US population. The health status of military family members closely resembles that of the US nonmilitary populations with health insurance; however, active duty personnel and military retirees may not be representative of the US population. Active duty and military retired beneficiaries were in excellent health before they joined military service, they maintained higher levels of fitness compared with the nonmilitary population during service, and they accessed preventive medical services at least annually to maintain military readiness. Active duty personnel and military retirees also have higher rates of tobacco use compared with the US nonmilitary populations.³⁰

In conclusion, our study documents considerable heterogeneity in rates of diagnosed depression by cancer site, and provides information regarding select characteristics of individuals at higher risk for this comorbidity. Cancer survivors who are diagnosed with depression use more than twice the amount of health care and cost nearly twice as much as do those survivors without the diagnosis of depression. The Military Health System, as well as other health care systems, might review the process by which individuals who are diagnosed with cancer are evaluated and treated for comorbid depression, both to improve quality care outcomes and possibly to realize cost savings.

References

- Trancas B, Cardoso G, Luengo A, Vieira C, Reis D. Depression in cancer patients: diagnostic and therapeutic considerations [in Portuguese]. *Acta Med Port.* 2010;23(6):1101-1112.
- Reeves WC, Strine TW, Pratt LA, et al. Mental illness surveillance among adults in the United States. *MMWR Surveill Summ.* 2011;60(suppl 3):1-29.
- Mitchell AJ, Chan M, Bhatti H, et al. Prevalence of depression, anxiety, and adjustment disorder in oncological, haematological, and palliative-care settings: A meta-analysis of 94 interview-based studies. *Lancet Oncol.* 2011;12(2):160-174.
- Vodermaier A, Linden W, MacKenzie R, Greig D, Marshall C. Disease stage predicts post-diagnosis anxiety and depression only in some types of cancer. *Br J Cancer.* 2011;105(12):1814-1817.
- Luutonen S, Vahlberg T, Eloranta S, Hyväri H, Salminen E. Breast cancer patients receiving postoperative radiotherapy: distress, depressive symptoms and unmet needs of psychosocial support. *Radiother Oncol.* 2011;100(2):299-303.
- Ziegler L, Hill K, Neilly L, et al. Identifying psychological distress at key stages of the cancer illness trajectory: A systematic review of validated self-report measures. *J Pain Symptom Manage.* 2011;41(3):619-636.
- Grassi L, Rosti G, Albieri G, Marangolo M. Depression and abnormal illness behavior in cancer patients. *Gen Hosp Psychiatry.* 1989;11(6):404-411.
- Jadoon NA, Munir W, Shahzad MA, Choudhry ZS. Assessment of depression and anxiety in adult cancer outpatients: a cross-sectional study. *BMC Cancer.* 2010;10:594.
- Thapa P, Rawal N, Bista Y. A study of depression and anxiety in cancer patients. *Nepal Med Coll J.* 2010;12(3):171-175.
- Punekar R. *Mental health, ambulatory mental health visits, and psychotherapeutic medications of US cancer survivors and their spouses* [dissertation]. University Park: The Pennsylvania State University; 2010.
- Brant JM, Beck S, Dudley WN, Cobb P, Pepper G, Miaskowski C. Symptom trajectories in posttreatment cancer survivors. *Cancer Nurs.* 2011;34(1):67-77.
- Gray NM, Hall SJ, Browne S, et al. Modifiable and fixed factors predicting quality of life in people with colorectal cancer. *Br J Cancer.* 2011;104(11):1697-1703.
- Shi Q, Smith TG, Michonski JD, Stein KD, Kaw C, Cleeland CS. Symptom burden in cancer survivors 1 year after diagnosis: a report from the American Cancer Society's Studies of Cancer Survivors. *Cancer.* 2011;117(12):2779-2790.
- Price MA, Butow PN, Costa DS, et al. Prevalence and predictors of anxiety and depression in women with invasive ovarian cancer and their caregivers. *Med J Aust.* 2010;193(5 suppl):S52-S57.
- Palgi Y, Shrira A, Haber Y, et al. Comorbidity of posttraumatic stress symptoms and depressive symptoms among gastric cancer patients. *Eur J Oncol Nurs.* 2011;15(5):454-458.
- Segrin C, Badger TA, Figueredo AJ. Stage of disease progression moderates the association between social support and depression in prostate cancer survivors. *J Psychosoc Oncol.* 2011;29(5):552-560.
- Neilson KA, Pollard AC, Boonzaier AM, et al. Psychological distress (depression and anxiety) in people with head and neck cancers. *Med J Aust.* 2010;193(5 Suppl):S48-51.
- Gonzalez BD, Jacobsen PB. Depression in lung cancer patients: the role of perceived stigma. *Psychooncology.* 2012;21(3):239-246.
- Whitney KA, Steiner AR, Lysaker PH, Estes DD, Hanna NH. Dimensional versus categorical use of the PHQ-9 depression scale among persons with non-small-cell lung cancer: a pilot study including quality-of-life comparisons. *J Support Oncol.* 2010;8(5):219-226.
- Welch CA, Czerwinski D, Ghimire B, Bertsimas D. Depression and costs of health care. *Psychosomatics.* 2009;50(4):392-401.
- Zabora J, BrintzenhofeSzoc K, Curbow B, Hooker C, Piantadosi S. The prevalence of psychological distress by cancer site. *Psychooncology.* 2001;10(1):19-28.
- Gao W, Bennett MI, Stark D, Murray S, Higginson IJ. Psychological distress in cancer from survivorship to end of life care: prevalence, associated factors and clinical implications. *Eur J Cancer.* 2010;46(11):2036-2044.
- Carver CS, Smith RG, Antoni MH, Petronis VM, Weiss S, Derhagopian RP. Optimistic personality and psychosocial well-being during treatment predict psychosocial well-being among long-term survivors of breast cancer. *Health Psychol.* 2005;24(5):508-516.
- Townsend AL, Ishler KJ, Bowman KF, Rose JH, Peak NJ. Health and well-being in older married female cancer survivors. *J Am Geriatr Soc.* 2009;57(suppl 2):S286-S288.
- Chan JY, Lua LL, Starmer HH, Sun DQ, Rosenblatt ES, Gourin CG. The relationship between depressive symptoms and initial quality of life and function in head and neck cancer. *Laryngoscope.* 2011;121(6):1212-1218.
- Reyes-Gibby CC, Anderson KO, Morrow PK, Shete S, Hassan S. Depressive symptoms and health-related quality of life in breast cancer survivors. *J Womens Health.* (Larchmt). 2012;21(3):311-318.
- Legler A, Bradley EH, Carlson MD. The effect of comorbidity burden on health care utilization for patients with cancer using hospice. *J Palliat Med.* 2011;14(6):751-756.
- Decroisette C, Monnet I, Berard H, et al. Epidemiology and treatment costs of bone metastases from lung cancer: a French prospective, observational, multicenter study (GFPC 0601). *J Thorac Oncol.* 2011;6(3):576-582.
- Mariotto AB, Yabroff KR, Shao Y, Feuer EJ, Brown ML. Projections of the cost of cancer care in the United States: 2010-2020 [published correction appears in *J Natl Cancer Inst.* 2011;103(8):699]. *J Natl Cancer Inst.* 2011;103(2):117-128.
- Institute of Medicine Committee on Smoking Cessation in Military and Veteran Populations. Scope of the problem. In: Bondurant S, Wedge R, eds. *Combating tobacco use in military and veteran populations.* Washington, DC: National Academies Press; 2009:31-78.