

Trends in Location of Death for Individuals with Primary Bone Tumors in the United States

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INTRODUCTION: Given significant morbidity and mortality associated with primary bone cancer, provision of high-quality end-of-life care concordant with patient preferences is critical. This study aimed to evaluate trends in utilization of dedicated end-of-life care settings and investigate sociodemographic disparities in location of death among primary bone cancer decedents.

METHODS:

A retrospective, population-based review of patients who died from primary bone cancer-related causes was performed using the Underlying Cause of Death Public Use Record from the Centers for Disease Control and Prevention (CDC) Wide-Ranging Online Data for Epidemiologic Research (WONDER) database for the years 2003-2019. Sociodemographic characteristics and location of death were recorded. Trends in utilization of various end-of-life care settings were measured, and multivariable logistic regression analyses were conducted to determine any independent associations between sociodemographic factors and location of death.

RESULTS: A total of 24,557 decedents were included. Over the study period, the proportion of primary bone cancer-related deaths occurring at home and in hospice increased, whereas those occurring in hospital, nursing home, and outpatient medical facility/ED settings decreased. Several sociodemographic factors were found to be associated with location of death, including age, marital status, and level of education. Moreover, racial and ethnic minority patients were at significantly lower risk of experiencing death at home (Black RRR: 0.67 [95% CI: 0.61-0.74]; American Indian/Alaska Native [AIAN] RRR: 0.66 [0.47-0.94]; Asian RRR: 0.53 [0.45-0.63]; Hispanic RRR 0.66 [0.60-0.72]), in a nursing home (Black RRR: 0.66 [0.57-0.77]; AIAN RRR: 0.53 [0.29-0.97]; Asian RRR: 0.42 [0.31-0.57]; Hispanic RRR 0.34 [0.28-0.41]), or in hospice (Black RRR: 0.72 [0.61-0.85]; AIAN RRR: 0.48 [0.23-0.96]; Asian RRR: 0.36 [0.25-0.50], Hispanic RRR 0.72 [0.25-0.51]) relative to a hospital compared to White patients.

DISCUSSION AND CONCLUSION: Though rates of in-hospital death from primary bone cancer are decreasing, marked racial and ethnic disparities in utilization of dedicated end-of-life care settings exist. These gaps must be addressed to ensure all primary bone cancer patients have equitable access to high-quality end-of-life care regardless of racial, ethnic, socioeconomic or status.

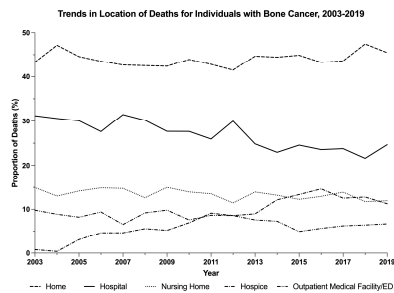


Table 1. Baseline characteristics for decedents with bone cancer. ED, Emergency Department.

Characteristic	Total Cohort	Hospital	Home	Nursing Home	Hospice	Outpatient Medical Facility/ED
Number	24,557 (100.0%)	6,567 (26.74%)	10,872 (44.27%)	3,271 (13.32%)	2,066 (8.41%)	1,781 (7.25%)
Age, year						
≤64	13,286 (54.10%)	4,798 (73.06%)	5,826 (53.59%)	705 (21.57%)	1,037 (50.19%)	920 (51.66%)
65-74	3,094 (12.58%)	762 (11.60%)	1,450 (13.25%)	385 (11.80%)	400 (19.36%)	297 (16.68%)
75-84	4,187 (17.05%)	673 (10.25%)	1,261 (11.58%)	946 (29.27%)	344 (16.65%)	313 (17.57%)
≥85	3,190 (12.89%)	334 (5.09%)	1,285 (11.82%)	1,035 (31.64%)	285 (13.79%)	251 (14.09%)
Sex						
Female	10,593 (43.14%)	2,637 (40.16%)	4,542 (41.78%)	1,647 (50.35%)	936 (45.30%)	831 (46.60%)
Male	13,964 (56.86%)	3,930 (59.84%)	6,330 (58.22%)	1,624 (49.65%)	1,130 (54.70%)	950 (53.34%)
Race						
White	20,881 (85.04%)	5,277 (80.16%)	9,464 (87.05%)	2,897 (88.37%)	1,812 (87.17%)	1,453 (80.48%)
Black	2,778 (11.31%)	925 (14.09%)	1,061 (9.76%)	501 (15.29%)	209 (10.12%)	282 (15.83%)
American Indian/Alaska Native	168 (0.68%)	62 (0.94%)	70 (0.64%)	15 (0.46%)	9 (0.44%)	12 (0.67%)
Hispanic	728 (2.96%)	303 (4.61%)	277 (2.55%)	58 (1.77%)	36 (1.74%)	54 (3.03%)
Ethnicity						
Non-Hispanic	21,894 (89.16%)	5,547 (84.47%)	9,739 (89.58%)	3,123 (95.48%)	1,861 (90.88%)	1,624 (91.18%)
Hispanic	2,663 (10.84%)	1,020 (15.53%)	1,133 (10.42%)	148 (4.52%)	205 (9.92%)	157 (8.82%)
Marital Status						
Unmarried	14,424 (58.74%)	3,961 (60.27%)	5,869 (53.88%)	2,287 (69.92%)	1,117 (54.07%)	1,173 (64.18%)
Married	10,133 (41.26%)	2,571 (39.18%)	5,003 (46.02%)	984 (29.98%)	949 (45.93%)	624 (35.82%)
Education						
High school or less	15,408 (62.74%)	3,984 (60.67%)	6,828 (62.72%)	2,216 (67.74%)	1,154 (55.86%)	1,126 (63.22%)
Some college or more	9,149 (37.26%)	2,583 (39.33%)	3,944 (36.28%)	1,055 (32.25%)	912 (44.14%)	655 (36.78%)

Table 2. Association between decedent sociodemographic characteristics and location of death for patients with bone cancer with hospital location as reference group. Data are shown as relative risk ratios with 95% confidence intervals. ED, Emergency Department (***, p < 0.001; **, p < 0.01; *, p < 0.05, n.s.: not significant).

Characteristic	Home vs Hospital (Reference)	Nursing Home vs Hospital (Reference)	Hospice vs Hospital (Reference)	Outpatient Medical Facility/ED vs Hospital (Reference)
Age, year				
≤64	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
65-74	1.81 (1.65-1.99) ***	5.31 (4.64-6.11) ***	2.31 (1.92-2.55) ***	2.68 (1.75-3.88) ***
75-84	2.11 (1.91-2.32) ***	8.99 (7.60-10.23) ***	2.16 (1.80-2.56) ***	2.36 (1.82-3.15) ***
≥85	2.95 (2.59-3.35) ***	17.61 (15.18-20.46) ***	3.67 (1.08-4.37) ***	3.58 (2.99-4.29) ***
Sex				
Female	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
Male	0.97 (0.91-1.04) n.s.	0.97 (0.88-1.07) n.s.	0.85 (0.77-0.95) **	0.87 (0.78-0.97) *
Race				
White	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
Black	0.67 (0.61-0.74) ***	0.66 (0.57-0.77) ***	0.72 (0.61-0.85) ***	1.12 (0.97-1.31) n.s.
American Indian/Alaska Native	0.66 (0.47-0.94) *	0.53 (0.29-0.97) *	0.48 (0.24-0.97) *	0.74 (0.40-1.40) n.s.
Hispanic	0.53 (0.45-0.63) ***	0.42 (0.31-0.57) ***	0.36 (0.25-0.51) ***	0.68 (0.51-0.92) *
Ethnicity				
Non-Hispanic	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
Hispanic	0.66 (0.60-0.72) ***	0.34 (0.28-0.41) ***	0.69 (0.34-0.81) ***	0.68 (0.50-0.92) ***
Marital Status				
Unmarried	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
Married	1.26 (1.17-1.34) ***	0.61 (0.55-0.67) ***	1.19 (1.07-1.33) **	0.81 (0.72-0.91) ***
Education				
High school or less	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
Some college or more	0.81 (0.76-0.86) ***	0.78 (0.71-0.86) ***	1.15 (1.04-1.26) **	0.92 (0.81-1.03) n.s.